South Carolina

Weapons of Mass Destruction (WMD)

Nuclear, Biological, Chemical (NBC)

Terrorism Response Field Operations Guide (FOG)

for

State of South Carolina
First Responders

South Carolina WMD FOG

South Carolina WMD FOG

SECTION I:
OVERVIEW

WMD/NBC Review 1

Local Response Requirements for a Terrorist WMD Incident 1

SECTION II:
RESPONDING TO TERRORIST INCIDENTS INVOLVING WMD/NBC

Indication of a Terrorist Incident Involving NBC/WMD 3

Initial Actions by Dispatch Personnel 3

Initial Actions by First Responders 3

Managing the Consequences of a Chemical Attack: Quick Reference 5

- Chemical Warfare Agents (CWA) 5
- Chemical Agents, Type, Symptoms, and Hazard 9

Chemical Agents

- Indicators 13
- Description 13
- First Responder Concerns 15
- Signs and Symptoms 15
- Chemical Agent Summary Reference 17

Biological Agents 21

- Indicators 21
- Description 21
- First Responder Concerns 22
- Biological Agent Summary 23

Nuclear or Radiological Agents **27**

Indicators 27
Description 27
First Responder Concerns 27
Radiation Exposure Effects on Personnel 31

SECTION III:
SCENE CONTROL

Initial Considerations **35**
Perimeter Control **36**

Establishing Perimeter Control 36
Perimeter Control Considerations 37
Establish the Standard "Control Zones" 37
Mapping Perimeter and Control Zones 37
Detection and Monitoring Equipment 38
Isolation/Standoff Distance Considerations 38

Scene Security Considerations **39**

Essential Responsibilities 39
Site Security/Agency Responsibility 39

Tactical Considerations

Properly Stage Vehicles 40
Avoid Vapor Clouds, Mist, and Unknown Liquids 40

Assign an Observer
Plan Tentative Escape Routes and Refuge Assembly Points 40
Prepare for Emergency Decontamination on Arrival and During All Phases of the Incident 40

Summary **41**

SECTION IV:
EMERGENCY MEDICAL TRIAGE AND TREATMENT

General **43**

Triage 43
Treatment

START System **44**

Introduction 44
Duties of the Triage Officer 44
Identifying Patients 44
Implementation of the START System 45
Children in Triage 47
Retriage 47
Quick Review 47

SECTION V:
DECONTAMINATION

General Information **49**
Gross Decontamination Corridor **50**
Emergency Self-Decontamination **51**
Safety **52**
Mass Decontamination Area Setup **53**
Engines in Parallel **53**

Appendix 1 to Section V **57**

A. Patient Decontamination Procedure **57**
B. Technical Decontamination Procedure **65**
C. Technical Decontamination Solutions **69**

SECTION VI:
ANNEXES

ANNEX A—A SYSTEMATIC APPROACH TO RESCUE OPERATIONS/ CHEMICAL AGENT RESPONSE A-1

ANNEX B—MEDICAL TREATMENT PROTOCOLS B-1

ANNEX C—PHARMACEUTICAL PRODUCT LIST FOR WMD RESPONSE FOR 1,000 PATIENTS C-1

ANNEX D—WMD PLANNING FOR EMERGENCY MANAGERS D-1

ANNEX E—THE FEDERAL AND STATE RESPONSE TO TERRORISM E-1

APPENDIX —SOUTH CAROLINA ORGANIZATION FOR EMERGENCY OPERATIONS E-9

ANNEX F—GLOSSARY F-1

ANNEX G—REFERENCES G-1

ANNEX H—ACRONYMS H-1

LIST OF TABLES

Chemical Agents, Type, Symptoms, and Hazard 9

Chemical Agent Summary Reference 17

Biological Agent Summary 23

Radiation Exposure Effects on Personnel 31

THIS PAGE IS INTENTIONALLY LEFT BLANK

South Carolina WMD FOG

I. OVERVIEW

A. WMD/NBC Review

The Defense Against Weapons of Mass Destruction Act refers to weapons of mass destruction (WMD) as chemical, biological, or radiological agents or materials that have the capability to cause death or serious injury to a significant number of people through the release, dissemination, or impact of such agents or materials. Response requirements differ for each NBC agent or material. Chemical agents require a traditional hazardous material (HAZMAT) type response with specialized equipment and pharmaceuticals. Biological agents require a response by the medical community similar to an epidemiologic response. It is unlikely that HAZMAT/Emergency Medical Services (EMS) responders would be called upon to respond to the consequences of a biological agent release. Radiation is an invisible hazard requiring specialized detection instruments. HAZMAT/EMS responders should make appropriate measurements/surveys with radiological detection equipment to determine the presence of a radiation hazard.

B. Local Response Requirements for a Terrorist WMD Incident

Despite a massive Federal effort to prepare for and manage the consequences of domestic nuclear, biological, and chemical (NBC) terrorism, a terrorist WMD incident response is dependent upon responders at the local level for initial emergency response requirements. It is unlikely that Federal resources will be available at the local level before 6 to 24 hours from the reported terrorist WMD incident. It is therefore prudent that emergency responders at the local level prepare for the eventuality of a terrorist WMD incident response. This FOG is designed to assist first responders in their responsibilities regarding an effective response to the consequences of a terrorist WMD incident.

THIS PAGE IS INTENTIONALLY LEFT BLANK

II. RESPONDING TO TERRORIST INCIDENTS INVOLVING WMD/NBC

A. Indication of a Terrorist Incident Involving WMD/NBC

NBC/WMD deployed in a civilian setting can include C/B warfare agents, the intentional release of industrial chemicals, or the release or explosion of nuclear or radiological materials. While each particular agent has its own unique signature and consequences, general outward warning signs or indicators include:

- Explosions that disperse or dispense liquids, mists, vapors, or gas.
- Explosions that seem to only destroy a package or bomb device.
- Unscheduled and unusual dissemination of aerosol sprays.
- Abandoned spray devices.
- Numerous dead animals, fish, or birds.
- Lack (or unusual abundance) of insect life.
- Mass casualties without obvious trauma.
- Definite pattern of casualties and common symptoms.
- Civilian panic in potential high-profile target areas (e.g., Government buildings, mass transit systems, sports arenas, etc.).

B. Initial Actions by Dispatch Personnel

- Dispatch personnel play a key role in mobilizing the proper response and support to a WMD incident.

- Dispatchers must be aware of potential target locations and the indicators of possible criminal or terrorist activity involving NBC agents.

- Dispatchers must know the indicators, signs, and symptoms of exposure to NBC agents and recognize unusual trends or patterns of activity indicative of a possible NBC incident.

- Dispatchers should make the proper notifications that are required to other responding agencies and should understand how WMD/NBC incidents will develop within the Incident Command System (ICS).

C. Initial Actions by First Responders

1. Initially, first responding units must **isolate** the area, **deny entry, control egress of victims**, and provide a **response information update**:

- Observed NBC indicators.
- Wind direction and weather conditions at scene.
- Number of apparent victims.
- Type of injuries; symptoms presented.
- Nature of NBC agents (if known) from detection equipment or monitors.
- Initial scene control perimeter and command post locations.

- Suggested safe access route and staging area.

2. **Next**, first responding units should:

- Request appropriate specialized resources such as HAZMAT teams, etc.
- Don full turnouts and SCBA.
- Identify the source of contamination, immediately isolate the area 1,500 feet in all directions, and designate zones of operation (Hot, Warm, and Cold). Consider weather effects during zone designation.
- Establish a “safe refuge” area within the Warm Zone for victims who can self-relocate.
- Provide emergency decontamination for victims who are outside the Hot Zone. Use a solution of 0.5-percent bleach (a 10:1 dilution).
- Initiate protective actions (evacuation or shelter in place), as needed, for the community.

D. Managing the Consequences of a Chemical Attack: A Quick Reference

Chemical Warfare Agents (CWA)

a. Nerve Agents

GA Tabun
GB Sarin
GD Soman
GF (no name)
VX (no name)

(All are heavier than air and **can be absorbed through eyes/lungs/skin.**)

Major Signs/Symptoms of Exposure

Pinpoint pupils (miosis)
Runny nose/salivation
Tightness of the chest, coughing
Jerking and twitching
Difficulty breathing
Nausea/vomiting/diarrhea
Sudden loss of consciousness
Convulsions/apnea

b. Blood Agents

AC Hydrogen Cyanide
CK Cyanogen Chloride

(AC is lighter than air, and CK is heavier than air.)

Signs/Symptoms of Inhalation Exposure

Headaches
Strong stimulated breathing
Loss of consciousness
Convulsions, apnea

(**NOTE:** Normal pupil size/no secretion)

Besides these effects, CK may cause burning/stinging on contact with eyes, exposed skin, or respiratory tract.

c. Blister Agents

HD Sulfur Mustard (delayed)
HN Nitrogen Mustard (delayed)
L Lewisite (effect immediate)

(All are heavier than air and **can be absorbed through eyes/lungs/skin.)**

Signs/Symptoms of Exposure

Reddening of eyes/gritty irritation
Reddening of skin
Severe itching/burning of skin
Blisters with/without pain
Sore throat, hoarseness
Dry cough/nausea/vomiting

NOTE: Signs/symptoms may not present until 2 to 24 hours after exposure to mustard agents.

d. Choking Agents

CG Phosgene
PS Chloropicrin
Cl Chlorine

(All are heavier than air.)

Signs/Symptoms of Exposure

Mild irritation of eyes, nose, and throat (immediate)
Shortness of breath, coughing, and frothy secretions (2 to 24 hours later)
Nausea/vomiting
Pulmonary edema

CAUTION: Riot control agents have more severe irritant effects on the eyes, nose, and throat, with some shortness of breath and coughing immediately after exposure.

e. Points to Remember

- Be aware of potential terrorist targets.
- Nerve, blood, blister, and choking agents are heavier than air except hydrogen cyanide.
- The respiratory tract and eyes are particularly susceptible to chemical agent exposure. Pinpoint pupils, dimness of vision, pain above the eyes, and tightness in chest are signs/symptoms of nerve agent exposure.

- The immediate and ongoing use of Self-Contained Breathing Apparatus (SCBA) (with minimal skin protection) will ensure survivability in a vapor hazardous environment[1].
- An incident involving a chemical agent is still a hazardous materials (HAZMAT) incident.
- Plan for decontamination of mass casualties; however, vapor exposure requires only the removal of clothing in a clean environment.
- Consider benefit of using positive pressure ventilation (PPV) and/or foam to dilute or suppress a chemical agent.
- Remember, a terrorist-related incident is a crime scene. Coordinate activities with law enforcement officers in the interest of safety, security, and preservation of evidence.
- Coordinate/manage requested/not requested outside resources.

f. On Scene

- Place apparatus upwind/upgrade.
- Use SCBA and wear protective clothing.
- Be alert for signs of secondary devices.[2]
- Avoid contact with **any** pool of liquid.
- Isolate/deny entry to area.
- Observe/report signs or symptoms of agent exposure. Ask victims about symptoms experienced and what happened.
- Triage/decontaminate/treat victims.
- Alert hospitals immediately of possible mass casualties.
- Decontaminate victims exposed to a **liquid agent** by removing all of their clothes and/or applying copious quantities of water or household bleach solution diluted to 0.5 percent*, whichever is practicable. Protect eyes and face of the victims. (Use bleach for nerve and blister agents only.) If bleach is used, rinse off solution thoroughly with water after 10 to 15 minutes.

---

[1] Gases may be present/undetected. Protective gear must be worn to avoid contact/inhalation. Possible combustive hazard.

[2] Packages/containers "out of place" or unusual in appearance (i.e., bulging/stained). May be difficult to identify owner of any briefcase, etc. unattended during event. Err on side of caution.

For **vapor exposure only,** or as a precautionary measure, remove victims' clothes to at least their underwear (i.e., women—bra and underpants; men—underpants).

* The use of 0.5-percent bleach solution is noted in the *Medical Management of Chemical Casualties Handbook,* 2nd edition, September 1995, Aberdeen Proving Ground, MD.

- Remember a terrorist attack is a crime scene. Preserve evidence where practical.
- Request the HAZMAT Team if it has not already been dispatched.
- Request more resources immediately if the incident has already exceeded the capability of on-scene resources or is likely to escalate.

Acknowledgement: Montgomery County Fire and Rescue Service (MCFRS), Montgomery County, MD. Prepared by Deputy Chief Ted Jarboe and District Chief Robert Stephan.

South Carolina WMD FOG

Chemical Agents, Type, Symptoms, and Hazard

Symbol/ Common Name	CAS Number	Possible Agent Type	Symptoms	Physical Characteristics	Hazard
GA (Tabun) GB (Sarin) GD (Soman) VX	77-81-6 107-44-8 96-64-0 50782-69-9	Nerve	Pinpointing of the pupils Dimness of vision Runny nose/salivation Tightness of chest Difficulty breathing Twitching or paralysis Tachycardia Vomiting Loss of consciousness Convulsions Incontinence Death	Colorless to lightly colored liquid at normal temperature. G agents slightly less volatile than water. V agents about as volatile as motor oil.	Respiratory effective within seconds to minutes. Skin dose effective in minutes to hours. Extremely toxic lethal agents.
H HD HN (all commonly called “mustard”)	505-60-2 505-60-2 538-07-08	Vesicant (Blister Agent)	Reddening of skin Blisters Eye pain and reddening Eye damage Coughing Airway irritation and damage	Oily light yellow to brown liquids With a strong odor of garlic. Fishy odor. H and HD freeze at 57 degrees F. All are volatile at room temperature.	Eye effects may appear in a few hours, respiratory effects and blisters in 2 to 24 hours. Can be lethal in large doses.
L (Lewisite)	541-25-3	Vesicant	Immediate pain or irritation of skin Other symptoms similar to the H agents	Oily colorless liquid with the odor of Geraniums. More volatile than H.	Immediate pain. Other symptoms in about 12 hours. Can be lethal in large doses.
CX (phosgene oxime)	35274-08-9	Vesicant	Immediate burning Wheal-like skin lesions Eye and airway irritation and damage	A solid below 95 degrees F, but vapor can result.	Immediate pain. Other symptoms shortly thereafter. Can be lethal in large doses.
AC (Hydrogen cyanide) CK (Cyanogen chloride)	74-90-8 506-77-44	Blood	Cherry red skin or lips Rapid breathing Dizziness Nausea, vomiting Headache Convulsions Death	Rapid evaporating liquids.	Can cause death in 6 to 8 minutes.
CG (Phosgene) Chlorine	75-44-5	Choking	Eye and airway irritation Dizziness Tightness of chest Delayed pulmonary edema	Rapid evaporating liquid with odor of newly mown hay. A gas at normal temperature.	In very high doses, can result in death after several days.

THIS PAGE IS INTENTIONALLY LEFT BLANK

NOTES

THIS PAGE IS INTENTIONALLY LEFT BLANK

E. Chemical Agents

1. Indicators

The threat of chemical terrorism includes the intentional release of industrial agents, as well as the deliberate use of weapons of warfare. Chemical warfare (CW) agents can be introduced via aerosol devices (munitions, sprayers, or aerosol generators); breaking containers; or covert dissemination. General indicators of possible chemical agent usage include:

a. Unusual Dead or Dying Animals (e.g., lack of insects)

b. Unexplained Casualties

- Multiple victims
- Serious illnesses
- Nausea, disorientation, difficulty breathing, or convulsions
- Definite casualty patterns

c. Unusual Liquid, Spray, or Vapor

- Droplets; oily film
- Unexplained odor
- Low-lying clouds/fog unrelated to weather

d. Suspicious Devices/Packages

- Unusual metal debris
- Abandoned spray devices
- Unexplained munitions

2. Description

Chemical agents include both *persistent* and *non-persistent* agents. Persistent agents (vapor, liquid, or dust) remain in the affected area for hours, days, or weeks. Non-persistent agents (primarily vapors) remain a hazard in the affected area for a shorter time period, usually minutes to hours.

a. Nerve Agents affect the transmission of nerve impulses by reacting with the enzyme cholinesterase, which permits an accumulation of acetylcholine and continuous muscle stimulation. Generally, these agents are liquids, clear to light brown in color, and tasteless.

These agents can be absorbed through the skin, eyes, or respiratory or gastrointestinal tracts. Nerve agents are organophosphates and include “G” series agents – Tabun (GA), Sarin (GB), Soman (GD), and GF, as well as VX series agents. G series agents are non-persistent, primarily a hazard to the respiratory tract, and are characterized by a very rapid rate of action. VX series agents are very rapid in terms of rate of action, persistence (days

to months), and have a consistency similar to motor oil. Their primary hazard involves direct contact to the skin or respiratory system from vapors.

The following descriptors characterize both the G and VX series agents:

Agent	Odor	Color (@20° C)
GA	None (pure) to fruity	Colorless to Brown Liquid
GB	Almost none when pure	Colorless Liquid
GD	Fruity; camphor (unpure)	Colorless Liquid
GF	Sweet, musty; peaches; shellac	Colorless Liquid
VX	None	Colorless to Amber Liquid

Symptoms indicative of nerve agent exposure include:

- **Initial.** Dimness of vision; miosis (constricted pupils); marked pinpointing of pupils (immediately upon exposure to vapor or aerosol; absent or delayed if absorbed through skin or ingested); runny nose; and localized sweating.

- *Advanced.* ***Tightness in chest; difficulty breathing; nausea and vomiting; involuntary twitching and jerking; frontal headaches; convulsions; and coma.***

b. Choking Agents irritate the alveoli in the lungs, which stimulates the secretion of fluids that results in pulmonary edema. Principal agents of this type are phosgene (CG) and diphosgene (DP). They are generally non-persistent and are primarily a respiratory hazard. Phosgene is a colorless gas, while diphosgene is a colorless liquid. Both have the odor of new mown hay, freshly cut grass, or green corn. Initial symptoms include tearing, dry throat, tightness of chest, coughing, nausea, vomiting, headache, and an initial slowing of pulse followed by an increase. Advanced symptoms include rapid, shallow breathing; painful cough; cyanosis; coughing of frothy sputum (severe); convulsions; a shock-like state; and pulmonary edema.

c. Blood Agents are CW agents that act upon the enzyme cytochrome oxidase and target the respiratory system of the blood, inhibiting the transfer of oxygen among cells. They include hydrogen cyanide (AC), cyanogen chloride (CK), and arsine (SA). They are considered non-persistent and colorless. Their primary hazard is respiratory in nature. AC has a faint odor resembling bitter almonds or peach kernels and is very rapid in terms of rate of action. CK has a pungent biting odor that can go unnoticed, and has a rapid rate of action. SA has a delayed rate of action (2 to 11 hours) and a mild garlic odor. Initial symptoms include headache and euphoria (or giddiness); acute tachypnea for AC; or immediate intense irritation of the nose, throat, and eyes; along with decreased rate of breathing and tightness of the chest for CK. Advanced symptoms include violent convulsions.

d. Blister Agents include mustards (H, HD [sulfur mustard]; HN-1, HN-2, and HN-3, [nitrogen mustard]; HT; arsenicals [Lewisite], etc.; and urticants [CX]). Persistency of mustards ranges from a day to several months; while arsenical and urticant persistency is short. Mustards tend to have a delayed rate of action; while arsenicals and urticants have immediate impact. Blister agents initially cause irritation of the eyes and respiratory tract, reddening of the skin, followed by blistering and then systemic poisoning.

e. Incapacitating Agents cause physiological or mental effects leading to temporary disability lasting from hours to days past exposure. These agents include central nervous system (CNS) depressants such as BZ or stimulants, including LSD.

f. Vomiting Agents irritate the upper respiratory tract triggering involuntary vomiting. They are usually dispersed by heat as fine particulate smoke and have short persistency. They are fast acting respiratory hazards.

g. Irritant or Tear Agents are chemical agents (often used in riot control situations) that stimulate tearing, temporary eye discomfort, and irritation to the skin. They have an immediate rate of action and are primarily a respiratory hazard with a short persistency.

3. First Responder Concerns

- Treat all incidents involving chemical agents as intentional HAZMAT situations. Whenever it is believed that a chemical agent has been released, assume that all personnel and property have been potentially contaminated within the release area.

- The possible mixing of chemical agents, or mixing of industrial agents, is an additional concern since mixtures complicate the symptom-based identification of agents used.

4. Signs and Symptoms

- After exposure to chemical agents, victims may present one or more of the symptoms described by the acronym SLUDGE (Salivation, Lacrimation, Urination, Diarrhea, Gastrointestinal, and Emesis).

- Determining from signs and symptoms alone that a victim has been exposed to a chemical agent can be difficult for a first responder. In general, at least two signs or symptoms should be present to limit the risk of mistaking exposure to less toxic substances with exposure to chemical agents.

- Protection from chemical agents requires full respiratory and skin protection. Your turnout gear, properly worn, will provide you with some protection.

- Nerve agent antidotes are available and decontamination will work if you get the liquid chemical agent off your skin quickly. Flushing with water is likely the most expedient and widely available decontamination process.

- Nerve agents are heavier than air. The G agents are fairly non-persistent, but VX is very persistent.

- Clothing contaminated with nerve agents can “off gas,” creating a problem for individuals around undecontaminated clothing who are unprotected.

- Without advance warning, first responders may not recognize the existence of a chemical agent attack. Responders should also be alert for secondary devices that may be initiated after their arrival on scene, either by booby traps or remotely triggered.

- Immediately request specialized resources such as HAZMAT teams and the U.S. Army Technical Escort Unit (TEU) to identify the exact nature of the chemical agent.

South Carolina WMD FOG

Chemical Agent Summary Reference

Type	Symbol/ Common Name	Volatility Persistency	CAS Number	PEL Ppm	Hazard	Symptom	Physical Characteristics
Choking	CG / Phosgene	Non-persistent	75-44-5	1.5	Respiratory	Coughing, choking	Gas odor. Newly mown hay.
	Cl / Chlorine	Non-persistent	7782-50-5	.4	Respiratory	Coughing, choking	Gas odor. Swimming pool.
Nerve	GA / Tabun	Non-persistent	77-81-G	0.0001	Respiratory, skin, eyes	Pinpointing of the pupils, dimness of vision; runny nose / salivation; tightness of chest; difficulty breathing; twitching or paralysis; tachycardia; vomiting; loss of consciousness; convulsions	Colorless to lightly colored liquid at normal temperature. G agents slightly less volatile than water; V agents about as volatile as motor oil
	GB / Sarin	Non-persistent	107-44-8	0.0001	Respiratory, skin, eyes		
	GD / Soman	Non-persistent	94-64-0	0.00003	Respiratory, skin, eyes		
	VX	Persistent	50782-69-9	0.00001	Respiratory, skin, eyes		
Blister	H / HD	Persistent	505-60-2	0.003	Respiratory, skin, eyes	Reddening of skin; blisters, eye pain, and reddening; eye damage; coughing; airway irritation and damage; eye effects may appear in a few hours; respiratory effects and blisters in 2 to 24 hours; can be lethal in large doses	Oily, light yellow to brown liquids with a strong odor of garlic; fishy odor; H and HD freeze at 57 degrees F; all are volatile at room temperature
	HN-1	Persistent	538-07-08	.003	Respiratory, skin, eyes		
	HN-2	Persistent	51-75-2*	.003	Respiratory, skin, eyes		
	HN-3	Persistent	555-77-1	.003	Respiratory, skin, eyes		
	HT	Persistent	505-60-2 693-07-2		Respiratory, skin, eyes		
	CX	Persistent	35274-08-9	Unknown	Respiratory, skin, eyes	Immediate burning; weal-like skin lesions; eye and airway irritation and damage	A solid below 95 degree F, but vapor can result
	L	Persistent	541-25-3	.003	Respiratory, skin, eyes	Immediate pain or irritation of skin; other symptoms similar to H agents	Oily, colorless liquid with the odor of geraniums, more volatile than H
Blood	AC	Non-persistent	74-99-8	5.0	Respiratory	Cherry red skin and lips; rapid breathing; dizziness; nausea; vomiting; headache; convulsions; death	Rapid evaporating liquids
	CK	Non-persistent	506-77-4	6	Respiratory		

*** – Respiratory**
n – Ocular

THIS PAGE IS INTENTIONALLY LEFT BLANK

NOTES

THIS PAGE IS INTENTIONALLY LEFT BLANK

F. Biological Agents

1. Indicators

It is unlikely that HAZMAT/EMS responders would be called upon to respond to the consequences of a biological agent release. However, responders should be familiar with biological agent characteristics.

Biological agents have the potential to be more lethal than chemical agents and are primarily deployed through aerosol spray or by introduction into a water system. General indicators of possible biological agent usage include:

a. Unusual Dead or Dying Animals/Fish

b. Unusual Casualties

- Unusual illness for region/area
- Definite pattern inconsistent with natural disease

c. Unusual Liquid, Spray, or Vapor

- Spraying and suspicious devices or packages
- Unusual swarms of insects

2. Description. Biological agents include *pathogens* that are living, reproducing, disease-producing organisms; *toxins* that are non-living poisons derived from living organisms; and *EBRs* that are chemical substances produced in the body to regulate bodily functions.

a. Pathogens

- **Bacteria** such as anthrax, tularemia, bubonic plague, etc. Bacteria are capable of reproducing outside of living cells.

- **Viruses** such as yellow fever, smallpox, HIV, ebola, or marburg. Viruses are infective agents composed of DNA or RNA that can only reproduce inside living cells.

- **Rickettsia** such as Q fever and Rocky Mountain spotted fever. These are parasitic microorganisms that naturally transmit diseases through the bites of fleas, ticks, etc. These parasites require a living host.

- Additional pathogens include yeasts and fungi as well as genetically engineered pathogens.

b. Toxins are non-living poisonous chemical compounds derived from living organisms. They include ricin, BTX, and saxitoxin. Toxins are thousands of times more lethal than standard chemical agents.

c. Endogenous Biological Regulators (EBRs) include hormones, adrenalin, and peptides.

The unusual or atypical presence of swarms of insects may be indicative of a biological agent attack with the insects serving as the delivery vector. *Unlike victims of exposure to chemical or radiological agents, victims of biological agent attack are not in and of themselves contaminated or contagious; however, they may serve as carriers of the disease.*

3. First Responder Concerns

The most practical method of initiating a biological agent attack is through the dispersal of aerosol particles. Biological agents may be able to enter the body through the respiratory tract, ingestion, or direct contact with skin or membranes. Unlike chemical agents, exposure to biological agents may not be immediately apparent, with casualties occurring hours, days, or weeks after exposure. In many cases, the first indication of a biological agent attack may occur after a number of unusual illnesses begin to appear in local hospital emergency departments. Without advance warning, first responders may not recognize the existence of a biological agent attack.

Treat all incidents involving biological agents as intentional HAZMAT situations. Whenever it is believed that a biological agent has been released, assume that all personnel and property have been contaminated in the release area.

Immediately request specialized resources such as public health officials at the county, State, or Federal levels, along with experts such as the Centers for Disease Control and Prevention (CDC) and the U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID) to identify the exact nature of the biological agent.

Pending identification of the agent, measures must be taken to prevent epidemic. These measures include isolation, avoiding all exposed food or water, and the restriction of personnel movement (quarantine). These procedures apply to both victims and first responding personnel.

Identify the source of contamination and designate zones of operation (Hot, Warm, and Cold). If large numbers of exposures are involved, quarantine may be necessary, with all victims being treated on site. If a small number of persons are exposed they should be decontaminated and transported to a hospital capable of conducting a bioassay of exposed persons.

South Carolina WMD FOG

Biological Agent Summary

Disease	Likely Method of Dissemination	Trans-missible Man to Man	Infective Dose	Incubation Period	Duration of Illness	Lethality	Persistence	Hazard Class
Anthrax	Spores in aerosol	No (except cutaneous)	8K to 10,000 spores	1 to 5 days	3 to 5 days (usually fatal)	High	Very stable, spores remain viable for years in soil	6.2
Cholera	1 Sabotage (food and water) 2 Aerosol	Rare	> 10^2 organisms	12 hours to 6 days	≥ 1 week	Low with treatment, high without	Unstable in aerosols and fresh water, stable in salt water	6.2
Pneumonic Plague	Aerosol	High	< 100 organisms	1 to 3 days	1 to 6 days (usually fatal)	High unless treated within 12 to 24 hours	For up to 1 year in soil, 270 days in bodies	6.2
Tularemia	Aerosol	No	1 to 50 organisms	1 to 10 days	≥ 2 weeks	Moderate if untreated	For months in moist soil or other media	6.2
Q Fever	1 Aerosol 2 Sabotage (food supply)	Rare	10 organisms (aerosol)	14 to 26 days	Weeks	Very low	For months on wood and sand	6.2
Ebola	1 Direct contact (endemic) 2 Aerosol (BW)	Moderate	1 to 10 plague forming units for primates	4 to 15 days	Death between 7 to 16 days	High for Zaire strain, moderate with Sudan	Relatively unstable	6.2
Smallpox	Aerosol	High	Assumed low	10 to 12 days	4 weeks	High to moderate	Very stable	6.2
Venezuelan Equine Encephalitis	1 Aerosol 2 Infected vectors	Low	Assumed very low	1 to 6 days	Days to weeks	Low	Relatively unstable	6.2
Botulinum Toxin	1 Aerosol 2 Sabotage (food and water)	No	0.001 µg/kg is LD_{50}	Variable (hours to days)	Death in 24 to 72 hours, lasts months if not lethal	High without respiratory support	For weeks in non-moving water and food	6.1
T-2 Mycotoxins	1 Aerosol 2 Sabotage	No	Moderate	2 to 4 hours	Days to months	Moderate	For years at room temperature	6.1
Ricin	1 Aerosol 2 Sabotage (food and water)	No	3 to 5 µg/kg is LD_{50}	Hours to days	Days; death within 10 to 12 days for ingestion	High	Stable	6.1
Staphylococcal Enterotoxin B	1 Aerosol 2 Sabotage (food supply)	No	Clinical illness from picogram range	1 to 6 hours	Hours	<1%	Resistant to freezing	6.1

THIS PAGE IS INTENTIONALLY LEFT BLANK

NOTES

THIS PAGE IS INTENTIONALLY LEFT BLANK

G. Nuclear or Radiological Agents

1. Indicators

While conventional nuclear emergencies (including fixed-site incidents at commercial or research reactors and transportation accidents) are many times more likely than a terrorist scenario, nuclear or radiological terrorism is a realistic concern. Response to a nuclear or radiological incident is compounded by the nature of radiation itself. Radiation is an invisible hazard. Unless confirmed by radiological detection equipment, the presence of a radiation hazard is difficult to ascertain. Factors to consider include:

- A stated threat to deploy a nuclear or radiological device.
- The presence of nuclear or radiological equipment (e.g., spent fuel canisters or nuclear transport vehicles).
- Nuclear placards or warning materials along with otherwise unexplained casualties.

2. Description. The scenarios constituting an intentional nuclear or radiological emergency include:

a. Use of an **Improvised Nuclear Device (IND)** that is any explosive device designed to cause a nuclear yield. Nuclear proliferation experts note that the only bar to constructing an IND is the availability of fissile materials. Depending upon the type of trigger device used, either uranium or plutonium isotopes can fuel these devices. While "weapons-grade" materials increase the efficiency of a given device, less than weapons grade materials can still be used.

b. Use of a **Radiological Dispersal Device** that is any explosive device utilized to spread radioactive material upon detonation. Any improvised explosive device can be exploited by surrounding it with radioactive materials.

c. Use of a **Simple Radiological Dispersal Device** where a radiological material is spread without the use of an explosive. Any nuclear material (including medical isotopes or waste) can be exploited in this manner.

3. First Responder Concerns

- Treat all nuclear or radiological incidents as HAZMAT situations. Whenever it is believed that a radiological agent or radioactive material has been released, assume that all personnel and property have been potentially contaminated within the release area.
- These incidents will require specialized resources/experts such as Health Physicists, Radiological Safety Officers, and the Department of Energy Nuclear Emergency Search Team (NEST) to identify the exact nature of the nuclear material.

- **Identify the source of contamination** and designate zones of operation (Hot, Warm, and Cold).

- Immediately **initiate personal protective measures** with special emphasis on respiratory protection. The goal is to limit exposure to a level "As Low As Reasonably Achievable (ALARA)."

  - This is achieved through the three factors of **time, distance, and shielding**. Monitor and evaluate personnel for exposure and contamination. Equipment and clothing must be assessed for contamination and decontaminated or contained, as needed.

- Rescue is dependent upon the type of radioactive material involved, the dose received, and duration of exposure.

- Remove victims from the source area. Personal Protective Equipment (PPE) requirements for rescue are dependent upon the type of radiation emitted, as follows:

  - **Alpha Particles.** First responders wearing SCBA respiratory protection and turnout gear are sufficiently protected.

  - **Beta Particles.** First responders wearing SCBA respiratory protection and turnout gear have sufficient protection for a "quick in and out" rescue situation.

  - **Gamma and Neutron**. Limiting the duration of exposure (time in the hazardous environment) is the only viable first responder precaution while wearing SCBA respiratory protection and turnout gear.

- Serious health consequences accompany exposure to large amounts of radiation. Radiation sickness may occur after an exposure to large amounts of radiation following a nuclear attack or major radiation accident**. Individuals suffering from radiation injuries are not radioactive once decontaminated.**

- **Treat victims of radiation exposure as follows:**

  - Limit further exposure to radiation source. Wrap victim in blanket or plastic sheeting to limit spread of surface contamination.

  - **Treat life threatening injuries first**; then treat additional traumatic injuries sustained in the incident; then provide symptomatic treatment for radiation illness.

  - Ensure assessment of radiological contamination with radiological detection equipment prior to decontamination. Positive readings indicate the need for decontamination. Preliminary decontamination should be done before transport to the hospital, if medical status permits. Contaminated clothing and runoff should be contained and labeled "Radioactive."

- Transport victims to a medical facility for definitive treatment. The medical facility must be notified in advance that patients exposed to radiation are en route. If possible, protective plastic sheeting should be applied to the interior of the ambulance to minimize potential contamination. The ambulance must be decontaminated prior to return to regular service.

THIS PAGE IS INTENTIONALLY LEFT BLANK

Radiation Exposure Effects on Personnel

RAD Dose Range	Initial Symptoms	Time of Initial Symptoms (Approx.)	Performance Capability (Mid-Dose Range)	Final Disposition
0 to 75	None to slight incidence of transient headache and nausea. Vomiting in up to 5 percent of personnel in upper part of range.	6 to 12 hours	Effective	No restriction
75 to 100	Transient mild nausea and vomiting in 5 to 30 percent of personnel.	6 to 20 hours	Effective	No deaths, no restriction
150 to 300	Transient mild to moderate nausea and vomiting in 20 to 70 percent of personnel. Mild to moderate fatigability and weakness in 25 to 60 percent of personnel.	3 hours to 2 days	DT: PD from 4 hours until recovery. UT: PD from 6 until 19 hours. PD: 6 weeks until recovery.	No restriction; less than 5 percent deaths at low end of exposure range; death may occur in 10 percent of personnel
300 to 530	Transient moderate nausea and vomiting in 50 to 90 percent of personnel. Moderate fatigability in 50 to 90 percent of personnel.	2 hours to 3 days	DT: PD from 3 hours until death or recovery. UT: PD from 4 hours until 40 hours, and 2 weeks until death or recovery.	No restriction at low end of exposure range; less than 10 percent deaths. At high end of exposure range, death may occur in more than 50 percent of personnel beginning after 4 weeks
530 to 830	Moderate to severe nausea and vomiting in 80 to 100 percent of personnel.	1 hour to 2 days	DT: PD from 2 hours until 3 weeks. CI from 3 weeks until death.	At low end of exposure range, death may occur in more than 50 percent of personnel beginning after 4 weeks. At high end of exposure range, 99 percent, beginning after 3 weeks
830 to 1,500	Moderate to severe fatigability and weakness in 90 to 100 percent of personnel.	2 hours to at least 6 weeks	DT: PD from 2 hours to 2 days and 7 days until 4 weeks.	1,000 RAD: death in 1 to 3 weeks.
	Moderate to severe nausea, vomiting, disorientation, and dizziness in 100 percent of personnel; moderate fluid loss in 80 percent of personnel.	45 minutes to 2½ days	DT: PD 1 hour until 6 hours and 1½ days until 1 week. CI: 6 hours until 1½ days and 1 week until death. UT: PD 1½ hours until 8 days. CI: 8 days until death.	

DT = Demanding Task
UT = Undemanding Task
PD = Performance Decrement (25% to 75% of performance level)
CI = Casualty Ineffective (<25% of performance level)

THIS PAGE IS INTENTIONALLY LEFT BLANK

NOTES

THIS PAGE IS INTENTIONALLY LEFT BLANK

III. SCENE CONTROL

A. Initial Considerations

Approaching a criminal event that has been created by an act of terrorism presents unique challenges to the responder. To effectively implement scene control and ensure public safety, emergency responders must quickly and accurately evaluate the incident area and determine the severity of danger. Once the magnitude of the incident is realized, attempts to isolate the danger can begin.

Establishing control (work) zones early will enhance public protection efforts and better facilitate medical treatment efforts.

Initially, when response resources are limited, isolating the hazard area and controlling a mass exodus of panicked and contaminated people will likely overwhelm the best efforts of first arriving responders. Responders must use any and all available resources in an effective and efficient manner in order to prepare the scene for ongoing operations.

Responders must be aware that **terrorists may still be lurking nearby** waiting for responders to arrive. In fact, the responders could be the actual target.

Terrorists may also be among the injured. If this is suspected, initial scene control will likely be delayed and dictated by law enforcement activities.

As in all hazardous situations, **self-protection** is a top priority. A responder who becomes a victim only adds to the burden on available resources.

Responders must **anticipate the potential for multiple hazard locations**. Responders may have to define outer and inner operational perimeters. There may exist several hazards within the outer perimeter that must be isolated, especially when victims are scattered throughout the boundaries of the incident, or multiple targets contain dangers.

Controlling the scene, isolating hazards, and attempting to conduct controlled evacuations will be resource intensive. Inordinate security may be needed for the event, so responders should request additional assistance early.

After a bombing, access to the scene may be limited due to rubble or debris. Police activity may also interfere with establishing access and exit avenues for operations.

Another problem may involve large numbers of contaminated victims and would-be rescuers moving in and out of the exclusion zone in an uncontrolled manner. In NBC incidents, secondary contamination is a major risk factor.

B. Perimeter Control

1. Establishing Perimeter Control

Perimeter control at terrorist incidents can be established by following recognized methods or standard operating procedures (SOPs). Maintaining control of the perimeter may be difficult due to the design of the terrorist or panic among the victims.

Recognizing and evaluating dangers is critical to implementing perimeter control. Adequately evaluating potential harm will guide decisions and considerations for "standoff" distances, or establishing "work zones." In order to perform this task efficiently and effectively, you should first take time to perform an adequate **sizeup** of the situation.

When initially determining your operating perimeter, it is better to overestimate the size of the perimeter than to underestimate. Once a perimeter is established, it is often easier to reduce the perimeter instead of attempting to push the public and the press back to increase it after operations are set up.

Depending on the size and complexity of the incident, the boundaries may need to be divided or identified as having **"outer"** and **"inner"** perimeters.

- The **outer perimeter** is the most distant control point or boundary of the incident. It is used to restrict all public access to the incident. For example, the outer perimeter established after the bombing of the Alfred P. Murrah Federal Building in Oklahoma City enclosed 20 square blocks.

- The **inner perimeter** isolates known hazards within the outer perimeter. It is often used to control movement of responders. An example of inner perimeters would be a case where following an explosion, several suspicious parcels are sighted. The locations of these items would be isolated until such time as specialists have rendered the area safe.

There are several types of terrorist incidents that may require outer and inner perimeter controls.

- Incidents involving **improvised explosive devices** should always have responders thinking about secondary devices. Use inner perimeters to control access to any suspicious area.

- In cases involving **C/B dispersion devices**, you may need to use inner perimeters to isolate areas of high suspect contamination as well as possible secondary devices.

- In cases of **radioactive contamination**, inner perimeters may be necessary to isolate possible areas of high contamination until specialists with radiation meters have determined the actual level of danger to responders.

2. Perimeter Control Considerations

Perimeter control may be influenced by a variety of factors. They should all be considered and weighed in relation to each other when attempting to determine your next course of action.

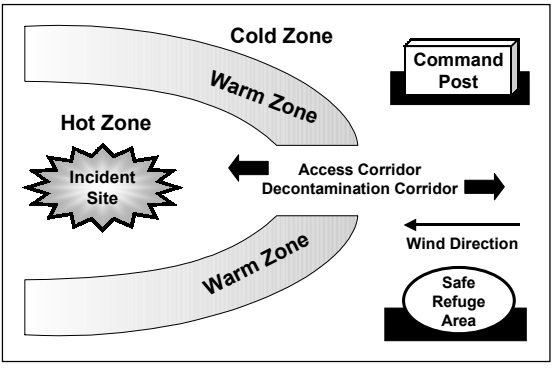
- The **amount and type of resources on hand** will provide a rough estimate of what it is possible to accomplish.
- The **capability of available resources** must also be considered. People should not attempt actions beyond their training.
- The **ability of the resources to self-protect** is a related factor. No matter how well personnel are trained, if they are unable to properly protect themselves, they cannot function in a hazardous environment.
- The **size and configuration of the incident**, as well as the **stability of the incident,** will also come into play.

These factors are the same whether you are dealing with a non-criminal hazardous materials incident or a terrorist attack. Never lose sight of the fact that the behavior of a material is not determined by whether the release was accidental or deliberate.

3. Establish the Standard "Control Zones"

As with any hazardous materials incident, you should establish the standard **control zones** within the outer perimeter. These include the:

- Hot (exclusion) Zone
- Warm Zone
- Cold (support) Zone



C23-B

4. Mapping Perimeter and Control Zones

Because of the potential for secondary and tertiary events, the perimeter and control zones should be mapped. If the incidents escalate, boundaries can be expanded using established reference points that are familiar to on-scene responders. Mapping components should include the **topography** of the area and any **structures or landmarks**. **Access and egress points** should be clearly marked, as should **perimeter boundaries**.

5. Detection and Monitoring Equipment

Using detection and monitoring equipment to substantiate effective perimeter and work zone boundaries is limited. Responders must attempt to identify "clean" areas as well as hazardous areas. This is usually accomplished by using detection and monitoring equipment while protected by appropriate PPE. However, equipment designed to detect hazardous materials may not be immediately available to first responders. In most cases, the responder will have to establish the perimeter by observing the scene for **outward warning indicators**.

6. Isolation/Standoff Distance Considerations

The first consideration is to identify the problem from incident information and outward warning signs and detection clues.

Incident information refers to information provided prior to the first responder arriving on the scene. This information can include written or verbal warnings and dispatch information. **Outward warning signs** and **detection clues** are collected during incident sizeup operations.

Decision making for isolation is based upon four main factors. First consider the **potential of harm** to life, critical systems, and property. If the potential harm is great, drastic measures may be called for.

- Physical factors such as the **topography** and **meteorological** factors should also be considered.
- Wind direction, time of day, and impending weather should all be taken into account.
- Lastly, responders must always consider the **resources available** to implement tactical operations. Consider how to use available resources to achieve tactical goals.

When making decisions concerning isolation and standoff distances, access reference materials such as the 2000 *Emergency Response Guidebook* to determine initial isolation and protection distances.

When limited information is available pertaining to the agent, Guide 111 in the *2000 Emergency Response Guidebook* recommends minimal isolation distances of 100 to 200 meters (330 to 660 feet) in all directions.

When responders suspect radioactive materials, the use of appropriate detection equipment is essential in determining isolation distances. Monitoring for radioactive materials at a bombing event should be done routinely. Monitoring is the only way to detect the presence of radiation on the scene.

C. Scene Security Considerations

1. Essential Responsibilities

Once the incident commander has assumed site control responsibilities, all entry and exit routes from hazardous areas must be effectively managed regardless of who has been tasked with the responsibility. Conventional methods of isolating unstable conditions, designating access points, establishing contamination reduction corridors and organized evacuations, should all be considered essential functions under site control and security responsibilities.

2. Site Security/Agency Responsibility

The agency assigned or designated with site security responsibilities will likely vary according to available resources (early in the incident a combination of police and fire personnel may jointly perform scene control and hazard isolation duties). Any time there is ongoing or unstable criminal activity present, law enforcement officials should dictate security measures for scene control. As the incident becomes more defined and more stable (intermediate phase), the shift from a combination of police and fire personnel in control of the perimeter, should begin to transition to all law enforcement. If the incident is of such magnitude that response activities may continue for days, the use of military units should be considered for perimeter security and control.

D. Tactical Considerations

When you approach any type of suspicious incident, you should do so in a cautious manner with all senses alert for warning signs and detection clues.

Always approach the scene utilizing **protective clothing and equipment** supplied by your agency. As with all incidents, self-protection is your first priority. If you are not properly protected, you will be unable to function effectively.

Be alert for **outward warning signs** that may indicate the type of danger present. Just because an explosion was reported, do not discount the possibility of chemical, biological, or radiological hazards.

Pay attention to casualties without apparent physical trauma as well as signs and symptoms indicating chemical exposure. A major hint of chemical exposure can be derived from the conjunction of multiple casualties and little physical injury.

Obvious signs of **criminal activity**, such as weapons on the scene, may indicate a perpetrator among the victims or lurking nearby. Coordinate your efforts with law enforcement agencies.

Pre-incident verbal or written **warnings** should always be taken seriously.

1. Properly Stage Vehicles

- During emergency conditions (especially if the incident has created large-scale public chaos and panic), responders must realize when approaching the event presenting conditions may not provide the most ideal locations to stage vehicles and apparatus.

- When practical, position first-in vehicles and responders **upwind** and **uphill**. Direct supporting responders to approach upwind and uphill.

- Avoid "stacking" vehicles where they interfere with each other's evacuation route. Also, avoid line-of-sight staging with suspected explosive devices. Strictly enforce staging instructions.

2. Avoid Vapor Clouds, Mist, and Unknown Liquids

If it is unknown, it is unsafe. Protect yourself.

3. Assign an Observer

- Initially, assign at least one responder to observe ongoing activities surrounding your operating position. This person should be alert for criminal activities and the potential for secondary events.

- The individual assigned to observation duty should closely observe the entire scene for potential armed assault (snipers); containers that could hold secondary devices (bags, boxes, briefcases, etc.); vehicles out of place; hazardous materials containers; or other anomalies. Suspicious areas should be identified and isolated until cleared by the appropriate authorities.

4. Plan Tentative Escape Routes and Assembly Points

Coordinate with law enforcement and other local agencies to identify safe escape routes and where people can go. It is far better to not need your plan than to not have it when you do.

5. Prepare for Emergency Decontamination on Arrival and During All Phases of the Incident

- Your agency should have predefined plans for emergency decontamination of large (mass decontamination) and small groups of contaminated personnel. These plans should be developed and maintained with the assistance of local medical and legal authorities in order to provide technically correct decontamination without incurring potential liability for privacy violations.

- Secondary contamination of responders and other members of the public is always a concern. Remember to treat all members of the public with proper regard for privacy as well as safety when performing decontamination operations. Responders who do not follow this policy have been subject to lawsuits and adverse judgments.

E. Summary

Terrorist incidents will likely present unique challenges to public safety responders when attempting to implement scene control measures. Responders must realize the importance of initiating appropriate scene control early in the event. Although the magnitude of the incident may seem beyond the capabilities of the first arriving units, efforts to gain control must start immediately, regardless of the resources on hand. Equally important is the need for responders to recognize outward warning signs on arrival. Responders who perform scene control tasks must incorporate full use of protective clothing and equipment until such time as the incident is well defined (by work zones) or determined to be safe.

THIS PAGE IS INTENTIONALLY LEFT BLANK

IV. EMERGENCY MEDICAL TRIAGE AND TREATMENT

A. General

1. Triage

- Triage is the process of doing the most good for the most victims. In NBC incidents, depending upon the purity of the agent, there may be few viable victims within the Hot Zone and increasing numbers of viable victims near the outer perimeter where the agent is less concentrated.

- Rapid medical intervention is indicated in exposures due to their immediate and sometimes irreversible effects on the patient.

- Victims should be triaged using the Simple Triage and Rapid Treatment (START) System as the triage protocol.

2. Treatment

- Rapid patient assessment should be conducted on all victims.

- Medical intervention should be initiated following existing protocols.

- Particular medical attention should be paid to airway/respiratory support and cardiovascular support.

- Medical care should address the supportive needs of each patient, and the specific treatment will be initiated when the agent is identified.

- On-site treatment may include care for injuries sustained as a result of explosions and/or falls.

- Consideration should be given to the medical and logistical implications of multiple doses of an antidote (e.g., atropine) being given to a single victim, thereby reducing the total number of patients that can be treated effectively.

- The Poison Control Center should be immediately notified of patient problems being seen and used as a resource for product identification and determining treatment regimens not covered by existing protocols.

B. START System

1. Introduction

The first arriving unit at a Multiple Casualty Incident (MCI) is often confronted with a situation in which the number of patients and the severity of the injuries overwhelm the rescuers' ability to treat everyone at once. In these situations, TRIAGE must be initiated in order to do the greatest good for the greatest number of patients. This means that historical and traditional approaches to patient care will not be possible and that while everyone expects a situation like this to arise in a "disaster" with 200 to 400 patients, it may be much more common in incidents involving only 4 to 6 patients.

The first priority is to bring order to chaos. Until backup help arrives, those patients in most urgent need of assistance must be identified, and this can only be performed using a quick and simple method of triage, the START (Simple Triage and Rapid Treatment) System.

2. Duties of the Triage Officer

The Triage Officer is traditionally the driver on the first arriving medic unit. Their first priority is to perform a quick scene assessment and sizeup, noting potential hazards and dangers, requesting additional manpower and equipment, and to obtain a rough estimate of patients. At the same time, triage must be initiated. With this in mind, it may be necessary for the Triage Officer to direct his partner to start the triage while he/she completes other responsibilities. Every patient must be counted and triaged. The Triage Officer does not engage in patient treatment, but if time permits, he/she must initiate retriaging of those patients still not evaluated.

Keep in mind that at most MCIs, patients will walk away or run toward responding vehicles, thus creating additional challenges and hazards.

3. Identifying Patients

Patients are to be triaged and marked with a tagging system using colored plastic surveyor's tape. The tape is to be tied to the patient, preferably to the upper arm. Use sufficient lengths to leave about 6 inches after tying the knot so that it is readily visible. This tape is cheap, waterproof, easily applied, and easily changed if the patient's condition warrants a change of triage status. The tape colors correspond with traditional triage color codes:

- RED = Immediate or Urgent Care.
- YELLOW = Delayed Care, patient can wait.
- GREEN = Non-Injured or Walking Wounded.
- BLACK = DEAD or Non-Salvageable.
- WHITE = Emergency decontamination completed.

4. Implementation of the START System

The START system relies on three primary triage criteria:

- R – RESPIRATIONS: Does the patient breathe? What is the rate?
- P – PERFUSION: Does the patient have a radial pulse?
- M – MENTATION: Can the patient follow a simple command?

Using these three simple criteria, each patient should be evaluated in 60 seconds and ideally in 10 to 15 seconds. Mistakes will be made, and patients' status may change; therefore, the Triage Officer must retriage and reassess each patient **as time allows**.

Early trauma deaths are caused by a disruption of the respiratory system, the vascular system, and the central nervous system. The START triage plan is designed to quickly evaluate these three systems: Is the patient ventilating? Does the patient have a peripheral pulse? Does the patient have an altered level of consciousness?

a. Scene Control

The rapid establishment of the MCI scene will provide a number of important factors:

- Greater safety for patients and rescuers.
- Increased opportunity to maximize available manpower and equipment.
- Greatest ease for evacuation of patients and ultimately their transportation.
- Easier communication within the MCI setting.

It is the responsibility of the Triage Officer to initially direct arriving personnel to assist in triage until that task is under control. At the same time, people must begin evacuating patients to treatment areas based on their triage color category.

The first step is to identify those patients who are able to walk. People who can walk rarely have life-threatening injuries. Address the scene and instruct all patients who can walk to get up and walk to a designated, **safe** area. This group will have to be retriaged later, but in the meantime, it quickly separates the **GREEN** patients. If possible, give one patient in this group **GREEN** tape and instruct them to tie a length on each patient. REMEMBER: These people should be kept nearby in order to utilize them as a source of emergency manpower to treat other patients!

b. Respirations

- Patients **without respiration = BLACK**.
- Patients who breathe after their **airway is opened = RED**.

The patient is given one attempt to breathe spontaneously when his/her airway is opened. The triage rescuer must not commit himself/herself to any one person, therefore only one attempt is made to open the airway. This is by positioning the head or clearing foreign material from the airway. If the patient then breathes spontaneously, then a bystander or GREEN patient must

be used to maintain the position or the patient can be rolled onto his/her side. Usual, normal
cervical spine precautions may have to be ignored. In a triage situation, the sheer number of patients and the importance of performing triage preclude otherwise normal precautions.

- Patients with **respiration of 30/min or greater = RED**.

This assessment must be rapid. Remember that 1 breath every 2 seconds = 30/min. If in doubt, be conservative. Trust your instincts. With practice, this assessment will be made quickly.

This first respiratory assessment has already categorized a number of patients into RED = Urgent or BLACK = "Dead" triage groups. Although checking mental status is last, it is obvious that by this time all unconscious patients have been triaged based upon their respiratory status, either RED or BLACK. If the patient's airway and respiratory status is normal or non-emergent, move on to the next assessment.

c. Perfusion – Pulse

- Patients **without a radial pulse = RED.**

The radial pulse is used to assess perfusion. It is generally accepted that a patient without a radial pulse has a blood pressure less than 80 mmHG, which indicates **SHOCK.**

NOTE: Direct pressure should be applied **to any life-threatening bleeding** either by the victim or one of the GREEN/walking-wounded patients. The triage rescuer may also assist the patient in shock by raising their lower extremities.

d. Mental Status – Mentation

- Assess patient's mentation by asking him/her to perform a simple command. Example: "Open your mouth and stick out your tongue." This tells the triage rescuer that not only can the patient process simple information, but that the patient is in control of his/her airway.

- If the patient is unable to follow a simple command = RED.

- If the patient is able to follow a simple command and has normal respiration and a radial pulse = YELLOW.

- Many people in MCI/Disaster situations are simply dazed or failed to hear the initial instructions. At this point, a patient might be asked to get up and move over to the GREEN area and join that triage group.

- Remember that as a triage rescuer, one of the first observations made about each patient is his/her level of consciousness; therefore, all unconscious patients will be triaged RED or BLACK immediately based on their ability to breathe. If doubt exists, ask them to follow a simple command.

5. Children in Triage

Children present special challenges to the Triage Officer utilizing the START criteria. Remember that a child with a respiratory rate of 60+/min = RED, the perfusion and mentation criteria are the same as that for an adult. In addition, the following are some guidelines to help in recognizing the child in distress = RED.

- Nasal flaring
- Grunting respirations
- Agitation/decreased level of consciousness/behavioral changes
- Pale mottle-cyanotic and cool, moist skin
- Evidence of significant blood loss

6. Retriage

Once all patients have been assessed and triaged, the need exists for the Triage Officer to retriage those patients still remaining at the scene. In any rapid assessment, mistakes may be made, and since a patient's status does change, this is a very real need. Remember that if a triage status is changed, the old color tape must be removed and the new color applied.

7. Quick Review

- **START** – "Simple Triage and Rapid Treatment."

- **Triage** – "To sort," "To choose."

  - Must be utilized whenever number of patients and severity of injuries make it impossible for rescuers to treat everyone at once.

  - Purpose: Do the greatest good for the greatest number! Separate patients into categories based on their chance of survival with treatment.

- **Triage Officer** – Emergency Medical Technician (EMT)/EMS Officer on first arriving vehicle.

  - Responsibilities include assessing the scene, sizing up, requesting additional manpower and equipment, and counting patients.

  - **Does not treat!** If time permits, retriage!

- **START Triage criteria: R,P,M.**

  - – **R –** **Respirations**. Does the patient breathe?
  - – **P –** **Perfusion**. Does the patient have a radial pulse?
  - – **M –** **Mental Status/Mentation**. Can the patient follow a simple command?

South Carolina WMD FOG

- Scene Assessment: Size up, note hazards, request help, and count patients.
- Direct walking wounded and the uninjured to a specific point = GREEN patients.
- Respirations:
  - If no respirations, open airway. Does patient breathe? NO = BLACK.
  - Open airway. Does patient breathe? YES = RED.
  - If spontaneous respirations are present, 30+/min (½ second) = RED.
  - If respirations are normal (less than 30/min), move on to the next check.

Remember: Make only one attempt to open airway. Airway may be maintained by utilizing GREEN patients or positioning patients on their side.

- **Perfusion**. (Stop any life-threatening bleeding)
  - Is a radial pulse present?
  - NO = RED
  - YES = Move on to the next check
  - Bleeding may be controlled by patient or other GREEN patients.
- **Mental Status**:
  - ***Can patient follow simple command*** like, "Open your mouth"?
  - **NO=RED**
  - **YES = YELLOW**

V. DECONTAMINATION

A. General Information

During the first few minutes of a response to a known or potential NBC event, responders will have a number of issues to deal with. Once you have identified that the incident is a HAZMAT/WMD event, important actions the first responders can take are:

- Protect yourself.
- Protect the public, within your capabilities.
- Notify and request appropriate resources.
- Initiate mass casualty gross decontamination.

While the Decontamination Corridor(s) are being established, evacuate potential and ambulatory victims upwind and uphill into holding/control areas in the outer perimeter of the Hot Zone. These areas should be easily identifiable through the use of RED scene tape. RED tape only will be used to indicate the Hot Zone. Consider the use of water fog handlines for control of the scene and/or to protect yourself. Keep in mind that every person who was potentially contaminated will be decontaminated.

One member should be positioned at the entry point to the corridor who is dressed in (**at a minimum)** their structural firefighting gear with SCBA and covered. Wear Nitrile rubber gloves. Minimize your contact with the patients. Keep in mind that even though you may not have physically touched any patients, you must consider yourself contaminated if you have been working within the Warm Zone. Consideration to using 1-hour bottles should be given to minimize the number of bottle exchanges that have to take place.

Within the decontamination corridor have a second member who controls the flow of patients. Ensure that all patients have removed their clothing at least to their under-garments. Upon entry into the decontamination corridor, each patient should be directed to:

- Enter the water.
- Raise their arms above their heads and turn 360 degrees, 2 to 3 times.
- Have the patients pay attention to their underarms and groin area.
- Direct the patients to the exit/holding area to await medical triage and treatment, as needed.

B. Gross Decontamination Corridor

The primary objective of the decontamination corridor is to provide large volumes of water within a controlled area to dilute or remove contaminants from a large number of patients.

- Time is critical.
- A large area will be required upwind of the Hot Zone. The corridor should extend from the Hot Zone nearest the incident site and extend through the Warm "Decontamination" Zone. It is important that the decontamination corridor not be too far away from the egress point of the Hot Zone. As a result of contamination, some victims may have vision difficulties or other physiological problems that may prevent them from being able to self-rescue.
- The control of runoff should be considered (i.e., going back into the Hot Zone). Your primary concern, however, is to keep the runoff from going into a "**Clean**" area. If you are dealing with a known radiological incident, confinement of runoff is critical.

NOTE: For chemical agents, it is possible that the agents will be diluted by the large amount of water and not present a major downstream hazard.

NOTE: For radiological agents, expect water to spread the contamination.

NOTE: For biological agents, downstream contamination will vary dependent upon the agent and environment.

- If time permits and resources are available, establish segregated lanes for symptomatic and asymptomatic as well as for male and female.
- Decontamination corridors can be established by placing engines parallel and using pike poles or ground ladders strung between the engines and covered with tarps.
- An option that should also be considered and may work well while the decontamination corridors are being established, or if resources are thin, is the use of handlines with the nozzles set to a wide fog pattern.
- Consider weather conditions. Patients who become hypothermic can become as much of a drain on responders as the actual NBC event itself.
- Communicate what the victims should do. Pre-made signs or bullhorns should be used to direct victims to the corridor.
- Consider terrain and wind direction, establish uphill, upwind, or crosswind, as necessary.
- Use hose lines and/or elevated master streams.

NOTE: Do not wait for soap or bleach, use copious amounts of water, immediately.

C. Emergency Self-Decontamination

- Wet down prior to removing clothing for nuclear or biological agents.
- Blot chemical agents from exposed skin immediately.
- Strip off all the clothing.
- Flush the affected area with large amounts of water, working from top down.
- Cover and seek immediate medical intervention.

At a minimum, all members must have on their turnouts with SCBAs and Nitrile gloves. Based on information received prior to arrival or upon arrival, if you witness patients exhibiting signs or symptoms of exposure, all personnel must use extra caution by covering and "going on air" and don Nitrile gloves prior to any patient contact.

NOTE: Structural firefighter gloves provide limited protection from NBC agents.

- **Decontamination Solution***

  Decontamination facilities for hospitals and medical treatment centers should contain multiple shower stations that are designed to allow patients to progress at various rates without compromising overall flow. Patients whose clinical condition deteriorates in the decontamination line can impede the progress of others. Plans must include means for sidetracking these patients into an area separate from the main decontamination sites, where treatment can be initiated.

  Current military doctrine regarding decontamination solution recommends an agent neutralizer such as a 0.5 percent solution of hypochlorite (bleach). It inactivates biological agents (except mycotoxins) and chemical agents such as mustard and organophosphates.

  However, 15 to 20 minutes of contact time is necessary for the inactivation of chemical agents. Furthermore, dilute bleach can cause tissue damage in open wounds, exposed nerve tissue, and the eyes. The lack of clear safety and efficacy data for bleach decontamination suggests that it should be avoided, especially if soap and water are immediately available.

  Decontamination can be accomplished by using a sequential copious warm water rinse, a hypoallergenic liquid soap wash, another warm water rinse, and then a final rinse after walking past other in-use showers. Incapacitated patients will require soap and water cleansing by staff, with attention to washing and rinsing the patient's back and the nonabsorbent backboard. The water temperature must be adjustable. Excessively warm water should be avoided, since this may promote peripheral vasodilatation and toxin absorption. Stiff brushes or abrasives should also be avoided since they may enhance dermal absorption of the toxin and can produce skin lesions that may be mistaken for chemical injuries. Sponges and disposable towels are affordable and effective alternatives.

  *Journal of the American Medical Association (JAMA), January 12, 2000 – Vol. 283, No. 2

D. Safety

At an incident with a potential chemical agent, it is of utmost importance to have respiratory protection donned. Chemical agents in the form of aerosolized liquid droplets, vapor, and/or gas may directly contact the eyes, skin, and/or the respiratory tract. Systemic reaction with dry intact skin is usually less important than these other routes. Vapor or gas exposure to the eyes and the respiratory tract is the most important hazard associated with non-persistent chemical agents.

An acronym that you can use to assist in your identification of the signs and symptoms of a potential chemical incident is **SLUDGE**:

- **S** – **Salivation**; drooling
- **L** – **Lacimation**; tearing
- **U** – **Urination**
- **D** – **Defecation**
- **G** – **Gastrointestina**l; pain and gas
- **E** – **Emesis**; vomiting

Besides the chemical itself, a major concern for firefighters is off-gassing from the patients. Keep in mind that this is a respiratory hazard and can be addressed through the use of SCBAs.

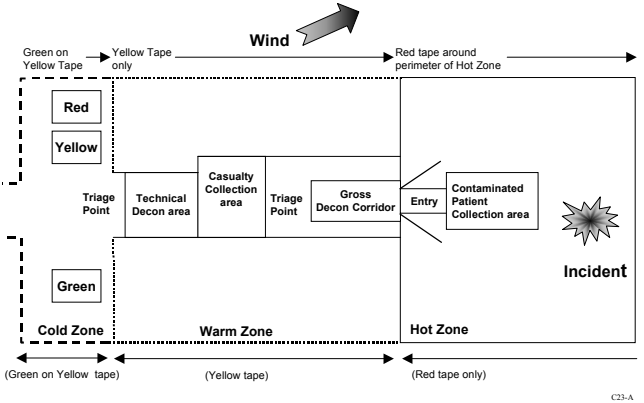
Typically, you probably will not arrive on a scene and see people lying around and exhibiting signs of a biological attack. It may be hours or days before a biological scenario becomes evident. In a biological attack, the primary routes of entry to the victims are ingestion or inhalation. Through minimizing contact with patients and wearing the appropriate PPE, you can greatly reduce the potential for serious adverse contamination.

Probably the least likely NBC event that you will respond to is a radiological incident. The key factors for safety at these types of incidents are:

- Time – Attempt to regulate length of exposure.
- Distance – Maintain your distance from the source.
- Shielding – Structural turnouts will offer some protection against Alpha particles.

Another issue that must be at the forefront of the responder's mind is the possibility of secondary devices. If you have responded to a scene where there has been an explosion, statistically there is a 70 percent chance that a secondary device will be present. Be alert to the possible presence of secondary devices and perpetrators in the area. The perpetrators may be the first victims.

E. Mass Decontamination Area Setup



Refer to the NAERG for initial isolation distances. If product is unknown or not listed, use Guide #111.

F. Engines in Parallel

An effective decontamination corridor can be set up quickly by positioning two engines parallel approximately 20 to 25 feet apart.

With 2½-inch fog nozzles attached to the discharge ports, position the engines so the fog patterns overlap in the corridor between the engines.

It is advisable to position the engines pointed away from the incident and at an angle so the front ends are closer than the tailboards. This does three things: It puts you in position to drive away if needed, it creates a natural funnel point for the patients, and it will direct the water back towards the Hot Zone.

NOTE: With down-turned discharge ports, you may find that you can get better directional control of the nozzle if you attach a siamese or gated wye versus attaching the nozzle directly to the port.

The basic concept is that by using large volumes of water at low pressure you will ensure a more complete decontamination.

With this type of setup, you may need to provide some sort of cover to address the modesty issue that some of your patients will have. If the engines are placed slightly closer, you may be able to bridge ladders over the hose beds and cover with tarps.

THIS PAGE IS INTENTIONALLY LEFT BLANK

NOTES

THIS PAGE IS INTENTIONALLY LEFT BLANK

APPENDIX 1 TO SECTION V

A. Patient Decontamination Procedure

1. Purpose

To provide a SOP for performing patient decontamination on ambulatory, non-ambulatory, and deceased patients who have been exposed to an agent posing the risk of secondary contamination.

2. Equipment Needed

a. Decontamination Supplies

• Backpack decon tanks/sprayers	8
• Brushes - soft bristle	4
• Brushes - firm bristle	4
• Toothbrushes	10
• Sponges/Mitts	10
• 5-gallon buckets	20
• Containment basins	2
• Backboards/Reeves stretcher	4
• Ivory soap	
• Bleach	
• Garden hoses	4-6
• PVC shower	2
• Trash barrels	10
• Marker cones	18
• Line tape	
• Towels	500
• Tarps	8
• Cut-All scissors	8
• Saw horses	8
• Decontamination tent	1
• Decontamination trailer	1
• Water supply	1
• Space clothing packs	500
• Spare SCBA/PAPRs	2

b. Medical Supplies

- Oxygen face masks (10)
- 4 x 4's
- 4 x 9's
- ABD dressing
- Suction vac (10)

- Oxygen with regulator (10)
- BVMs (10)
- Triangle bandages
- Cervical collars
- Kling
- 3-inch tape
- OP Airways (#5,3)
- Antidote Kits (MARK I, cyanide)

3. Setup

a. Standard Method

(1) Procure needed equipment from storage trailer.

(2) Locate large 100 x 100 foot size flat, secure, protected area adjacent to the Hot Zone and protected from the media and the public.

(3) The selected area should be positioned based upon ground/floor control and wind/ airflow direction.

(4) The decontamination area should be level or sloped toward the entrance.

(5) A minimum of two personnel should be assigned to set up the system.

(6) Cones and/or rope should be used to identify perimeter outline.

(7) Entry and exit points should be well marked.

(8) Sufficient disposal units should be available and in place for contaminated clothing and equipment dropoff.

(9) The system should be laid out to be used for performing medical decontamination, technical decontamination, or both.

(10) Designated decontamination solution(s) should be mixed per guidance on page 65.

(11) Spare respiratory protection should be immediately available.

(12) The system may be modified to include the decontamination trailer as one side of the decontamination area **or** be self-standing as a second decontamination sector.

(13) A decontamination PVC shower may be used as an alternative to a hose spray wash at one or more of the wash/rinse stations.

(14) Towels and clothing packs should be placed in a clean area along with medical supplies.

(15) Reasonable efforts for the circumstance should be initiated to control runoff; saving lives is the priority.

4. Process

a. Every patient believed to have been exposed to an agent with a risk of secondary contamination is to receive at minimum gross decontamination.

b. Gross Decontamination (Strip and Rinse)

(1) ***Ambulatory Patients***

(a) Will usually be done by entry team personnel.

(b) Direct patients by voice, PA amplification, and/or hand signals to the gross decontamination area just inside the Hot Zone but away from the high-risk area.

(c) Direct patients to remove their clothing down to their underwear.

(d) As often as possible, place all personal effects in trash barrels, separating personal effects (e.g., wallets, rings, watches, identification [ID], etc.) into clear plastic bags with the victim's name or a unique identifying number (e.g., triage tag, ticket, etc.) placed on the bags whenever possible.

(e) Particulate matter should be vacuumed, brushed, or wiped off all contaminated areas.

(f) Using hand-held sprayers containing tepid water and/or a dilute bleach solution, perform a 1-minute rinse from head to toe.

(g) Have victims close their mouths and eyes while being decontaminated.

(h) Proceed to the decontamination sector.

(2) ***Non-Ambulatory Patients***

(a) The entry team shall remove the victim from the high-risk area in the quickest way possible and carry the patient (preferably on a Stokes or Reeves stretcher or backboard) to the peripheral edge of the Hot Zone, bordering the Warm Zone.

(b) Remove the patient's clothing, cutting it off if necessary, down to the underwear.

(c) Place the cloths in the trash barrel.

(d) Particulate matter should be vacuumed, brushed, or wiped off.

(e) Using the hand-held sprayer or hose line, rinse the patient with tepid water for 1 minute, beginning with the face and airway, then open wounds, followed by head-to-toe rinsing in a systematic fashion.

(f) When rinsing the face, close the mouth and pinch the nose shut.

(g) Assure armpits, genitalia, and the back are rinsed.

(h) Rinse the backboard unless switch to clean board will be done before transfer to the Cold Zone.

(i) If a C-spine injury is suspected and a C-collar is available, apply the collar as soon as possible.

(j) Unless secondary decontamination is to be done, pass the patient into decontamination alley to be quickly dried, covered, and wrapped in an enclosing blanket and then carried to the Cold Zone on a backboard.

(k) Properly protected Cold Zone personnel will take the patient and render appropriate patient care.

(l) If a radiologic agent is involved, the decontamination team should scan the patient with detection equipment and report the results to the treatment team.

c. Secondary Decontamination (Rinse/Wash/Rinse)

(1) ***Ambulatory Patients***

(a) Depending on the patient's condition, the number of casualties, the environment and personnel resources, the decision may be made to perform secondary decontamination to more thoroughly clean each patient. This will be done in the Warm Zone decontamination area.

(b) The patient will be washed from head to toe using water and Ivory soap (water, with flour or oatmeal, may be used if radiologic agent is suspected) or dilute (0.5 percent) bleach solution.

(c) Soft bristle brushes or sponges should be used to clean the patient in a systematic fashion, starting at the head.

(d) Brushing should be done in a fashion to remove the product but not lead to abrading or irritation of the skin.

(e) The patient should be rinsed in a systematic fashion avoiding overspray and cross-contamination.

(f) Cover open wounds with dressings and/or bandages after decontamination is completed.

(g) Eye irrigation should be conducted using normal saline running through either a nasal cannula or Morgan Lens (placed over an anesthetized eye). Decontamination solutions other than normal saline are <u>not</u> to be used to decontaminate a victim's eyes.

(h) Have the patient dry off and put on a gown; then, direct them to the cold zone - treatment personnel.

(i) If a radiologic agent is suspected and detection equipment is available, perform head-to-toe sweep noting the level and reporting it to the Incident Commander and/or the treatment team; the Incident Commander will determine if further decontamination is warranted before proceeding into the Cold Zone.

(2) ***Non-Ambulatory Patients***

(a) Depending on the patient's condition, the number of casualties, the environment, and personnel resources, the decision may be made to perform secondary decontamination to more thoroughly clean each patient.

(b) A minimum of two decontamination personnel per patient will be needed to perform decontamination in this situation.

(c) Once inside the decontamination alley, the patient, on a backboard, shall be placed atop two sawhorses over a containment basin.

(d) The airway should be established and protected and oxygen administered via non-rebreather face masks or with BVM.

(e) The patient will be washed from head to toe using water and Ivory soap, or a dilute (0.5 percent) bleach solution.

(f) Soft bristle brushes or sponges should be used for washing in a systematic fashion.

(g) Brushing should be done in a fashion to remove the product but not lead to abrading or irritation of the skin.

(h) The patient should be rinsed in a systematic fashion avoiding overspray and cross-contamination.

(i) Open wounds should be covered with dressings and/or bandages after decontamination is completed.

(j) Assure the back, armpits, and genitalia are thoroughly washed and rinsed.

(k) Carefully rinse the backboard, unless a rotation onto a clean board is planned before the patient is taken into the Cold Zone.

(l) Eye irrigation should be conducted using normal saline running through either a nasal cannula or Morgan Lens (placed over an anesthetized eye).

(m) If a radiologic agent is suspected and detection equipment is available, perform a head-to-toe sweep noting the level and report it to the Incident Commander and/or the treatment team.

(n) Quickly dry off the patient and cover with a blanket in an encapsulatory fashion.

(o) Before transferring the patient into the Cold Zone, remove all treatment equipment used on the patient and dispose of them in the trash barrels.

(p) Transfer the patient to properly protected treatment personnel in the Cold Zone.

5. Decontamination Triage

a. In cases involving multiple patients, priority will be placed on (1) gross decontamination of ambulatory patients, followed by (2) decontaminating conscious, non-ambulatory patients, after which (3) unconscious, non-ambulatory patients should be decontaminated. Deceased victims are the lowest priority.

b. Patients' triage priority may be written on their foreheads with a felt tip pen by the entry and/or decontamination team.

6. Mass Decontamination

a. In cases involving extraordinary numbers of patients, the Incident Commander may decide to perform any of the following:

(1) Procure 1½-inch to 1¾-inch hose lines and use a fine spray to rinse as many people as possible en masse. Their clothing should be left where they stand for eventual collection by law enforcement personnel. Patients should be given a 1-minute rinse and directed to a designated decontamination sector or treatment area.

(2) Use a deck gun with wide angle spray and rinse as many patients as possible en masse similar to number (2) above.

(3) Use a combination of numbers (1) or (2) above.

7. Rendering Advanced Care

a. Patients exposed to suspected nerve gas and symptomatic shall be given MARK I antidotes immediately, preferably through deconned skin, if possible, and continue on through decontamination.

b. Patients requiring critical care (i.e., intubation, needle decompression, etc.) will be removed from the decontamination alley for the procedure to be performed safely and so as not to interfere with the decontamination process of remaining personnel. Once completed, a decision will be made by the EMS Officer whether to return the patient for further decontamination or be wrapped in an encapsulated blanket and sent to the Cold Zone.

c. Critical care patients will not be taken care of at the expense of those less critically injured **except** in cases where a response team member is involved.

d. Decisions concerning the degree of advanced care to be rendered will be made by the EMS Officer.

8. Decontamination of the Deceased

a. The Incident Commander/HAZMAT Team Chief, in conjunction with local and State officials, will determine how to handle the deceased.

b. No deceased victim will be removed from the incident scene without first being given **both** gross and secondary decontamination.

c. A decision will be made by the Incident Commander/HAZMAT Team Chief, in conjunction with the Field Operations Officer, whether to do gross decontamination where the body is found before moving the deceased to decontamination alley.

d. Decontamination of the deceased will occur once decontamination of the living is completed.

e. Victims who are receiving treatment and become deceased (Under Treatment Death) should be placed in a body bag and removed as soon as possible to the designated area.

THIS PAGE IS INTENTIONALLY LEFT BLANK

B. Technical Decontamination Procedure

1. Purpose

To provide a standard operating procedure for performing decontamination (technical) on personnel wearing PPE who have been exposed to an agent that poses the risk of secondary contamination.

2. Equipment Needed

a. Decontamination Supplies

• Backpack decon tanks/sprayers	8
• Brushes - soft bristle	4
• Brushes - firm bristle	4
• Toothbrushes	10
• Sponges/mitts	10
• 5-gallon buckets	20
• Containment basins	2
• Backboards/Reeves stretcher	4
• Ivory soap	
• Bleach	
• Garden hoses	4-6
• PVC shower	2
• Trash barrels	10
• Marker cones	18
• Line tape	
• Towels	500
• Tarps	8
• Cut-All scissors	8
• Sawhorses	8
• Decontamination tent	1
• Decontamination trailer	1
• Water supply	1
• Space clothing packs	500
• Spare SCBA/PAPRs	2

b. Medical Supplies

- Oxygen face masks
- 4 x 4's
- 4 x 9's
- ABD dressing
- Suction vac
- Oxygen with regulator
- BVM

- Triangle bandages
- Cervical collars
- Kling
- 3-inch tape
- OP Airways

3. Setup

a. Standard Method

(1) Procure needed equipment from storage trailer.

(2) Locate large 100 x 100 foot size flat, secure, protected area adjacent to the Hot Zone and protected from the media and the public.

(3) The selected area should be positioned based upon ground/floor control and wind/airflow direction.

(4) The decontamination area should be level or sloped toward entrance.

(5) A minimum of two personnel should be assigned to set up the system as per the attached diagram.

(6) Cones and/or rope should be used to identify perimeter outline.

(7) Entry and exit points should be well marked.

(8) Sufficient disposal units should be available and in place for contaminated clothing and equipment dropoff.

(9) The system should be laid out to be used for performing medical decontamination, technical decontamination, or both.

(10) Designated decontamination solution(s) should be mixed per guidance on page 68.

(11) Spare respiratory protection should be immediately available.

(12) The system may be modified to include the decontamination trailer as one side of the decontamination area **or** be self-standing as a second decontamination sector.

(13) A decontamination PVC shower may be used as an alternative to a hose spray wash at one or more of the wash/rinse stations.

(14) Towels and clothing packs should be placed in a clean area along with medical supplies.

(15) Reasonable efforts for the circumstance should be initiated to control runoff; saving lives is the priority.

4. Process

a. Personnel shall enter the decontamination area from the Hot Zone side.

b. Tools should be dropped on dirty side in the designated area.

c. A decontamination team member should confirm that personnel to be decontaminated are okay and have adequate air supply. If a problem exists, emergency decontamination is to be initiated.

d. Remove contaminant(s) as follows:

(1) Step into containment basin.

(2) Protective clothing should be examined for cuts and breaches.

(3) Initiate rinse/scrub/rinse of the PPE, beginning at the head and systematically moving down towards the feet.

(4) Avoid overspray and splashing.

(5) Assure boots, gloves, kneecaps, and axilla are cleaned.

(6) Use a "walker" for stabilization, if needed.

(7) Repeat rinse/wash/rinse until item is believed to be cleaned.

(8) Use the Decontamination Check if available.

(9) Move out of the spray/wash area.

e. Remove/replace respiratory protection.

(1) Open suit carefully first if vapor tight suit (Level A) is used.

(2) When the suit is unzipped, peel it back so that dirty side is faced inward and then fold down.

(3) Changeover SCBA or remove, placing the used item on dirty side. Changeover of SCBA will require a decontamination team member's assistance.

(4) Changeover of a complete SCBA will be preferable to replacing just the bottle.

(5) The facepiece shall be left in place.

f. Remove protective clothing.

(1) If possible, have the individual sit down in a chair. Removal should be done primarily by a decontamination team member.

(2) Remove duct tape or bands if used.

(3) Remove outer glove; turn inside out.

(4) Fold down the suit to boot level.

(5) Remove boots; place them in the designated boot trash can.

(6) Complete the suit removal; place in designated trash can.

(7) Remove the face mask and place it in the designated trash can.

(8) Remove cold/heat vest, if used.

g. Remove outer personal clothing, if contamination is suspected.

h. Proceed to the decontamination shower, if required.

i. Dry off and redress into clean clothing.

j. Report to the Rehabilitation Sector for rest, rehydration, and medical monitoring.

C. Technical Decontamination Solutions (U.S. Environmental Protection Agency [EPA])

1. For Unknown Products

a. Solution A: Five percent sodium carbonate and 5 percent trisodium phosphate. Mix 4 pounds of commercial-grade trisodium phosphate with each 10 gallons of water.

b. Solution B: Solution containing 10 percent calcium hypochlorite. Mix 8 pounds with 10 gallons of water.

c. Rinse Solution: To be used for both solutions. Five percent solution of trisodium phosphate with each 10 gallons of water.

2. For Known Products within the 10 Hazard Classes

a. Solution A: A solution containing 5 percent sodium carbonate and 5 percent trisodium phosphate.

b. Solution B: A solution containing 10 percent calcium hypochlorite.

c. Solution C: A solution containing 5 percent trisodium phosphate, which can be used as a general-purpose rinse.

d. Solution D: A dilute solution of hydrochloric acid (HCl). Mix 1 pint of concentrated HCl into 10 gallons of water (acid to water only). Stir with wood or plastic stirrer.

3. Guideline for Selecting Degradation Chemicals for Specific Types of Hazards

a.	Inorganic acids, metal processing wastes	Solution A
b.	Heavy metals: mercury, lead, cadmium, etc.	Solution B
c.	Pesticides, chlorinated phenols, dioxins, PCPs	Solution B
d.	Cyanides, ammonia, and other non-acidic inorganic wastes	Solution B
e.	Solvents and organic compounds such as trichloroethylene, chloroform, and toluene	Solution C (or A)
f.	PBBs and PCBs	Solution C (or A)
g.	Oily, greasy, unspecified wastes not suspected to be contaminated with pesticides	Solution C
h.	Inorganic bases, alkali, and caustic wastes	Solution D

THIS PAGE IS INTENTIONALLY LEFT BLANK

NOTES

THIS PAGE IS INTENTIONALLY LEFT BLANK

ANNEX A

A SYSTEMATIC APPROACH TO RESCUE OPERATIONS/ CHEMICAL AGENT RESPONSE

A. General

The **guidelines** below are intended to help first responders to a chemical agent attack develop an action plan to safely and effectively rescue **live victims**.

The Level A suit **represents the highest level** of protection to emergency responders against both respiratory and skin hazards of exposure to chemical (and biological) warfare agents. However, if the number of **live victims** exposed to and impaired by chemical agent(s) exceeds the availability of personnel in Level A suits to rescue in a timely manner, the Incident Commander (IC) must consider the use of other acceptable personal protective ensembles.

Turnout gear with SCBA provides less protection than Level A suits, but will allow short exposures. Configurations of turnout gear with SCBA, listed in order of increased protection, include:

- Standard (no use of duct tape)
- Self-taped
- Buddy-taped
- Turnout gear over Tyvek F undergarment

Saving live victims is the rescue mission, while minimizing risk of harm to the rescuers.

NOTE: First responders must gather information about the incident based on:

- Signs and symptoms of casualties.
- Comments from casualties and onlookers.
- Previous responder reconnaissance or detector readings.
- Information available through intelligence provided by law enforcement officers.
- Site specific information.
- Current and forecast weather conditions.

NOTE: First responders should not assume an incident involves a highly toxic chemical agent. The released material could be a less toxic industrial chemical or a riot control agent such as pepper spray.

B. Key Factors and Steps to Help Decide Whether Rescue is a "Go" or a "No Go" Situation

1. Weather Conditions. Consider the impact of wind direction and speed, temperature and humidity, and precipitation on the behavior and spread of the chemical agent(s) and on emergency operations. Use on-scene weather monitoring equipment, if available.

2. Scene Hazard Assessment. Avoid "tunnel vision." Don't just assume chemical-related hazards. Also consider the possible presence of biological agents, radiological materials, and/or explosive devices.

3. Reconnaissance (RECON). Conduct RECON using the following steps to determine if live victims are still in the area of the chemical release.

a. Preliminary Assessment. If available, view the contaminated area through a closed window or an entrance doorway (or other upwind location) to gather victim information. During the first step (before entering the building), the RECON Team must wear **at least** turnout gear with SCBA. If:

- You observe living victims with nerve agent exposure symptoms.
- Victims have been exposed for 15 minutes or more.
- Mustard (HD) is not suspected.
- The room the victims occupy is directly accessible without having to transit ante-chambers, stairwells, or other adjacent rooms.

When the RECON mission is finished, the Incident Commander can consider immediately starting the rescue mission (no longer than 30 minutes exposure for each responder) for live victims.

NOTE: If mustard is suspected, rescue can continue at increased risk to rescuers. Additionally, modeling of test results shows that up to 5 percent of rescuers exposed for 10 minutes could experience latent skin blistering in more susceptible areas, such as the groin and neck.

b. Search. If no living victims are visible from outside the building, the Incident Commander should assume a high concentration of chemical agent likely is present. However, the Incident Commander may consider a rapid reconnaissance by entering the building for no more than 1.5 minutes (1 minute and 30 seconds) only to look for living victims.

NOTE: Before entry, the RECON Team must increase their level of protection by at least self-duct taping protection clothing openings and closure and continuing SCBA use. Duct tape the following closures and openings as a minimum: the neck, around the face piece, the fly, wrists, ankles, waist, and the closure down the front of the jacket.

c. Rescue in Conjunction with RECON. During a quick RECON inside the contaminated building, consider rescue actions if:

- You observe living victims with nerve agent exposure symptoms.
- Victims have been exposed for 15 minutes or more.
- Mustard (HD) is not suspected.

Then the Incident Commander can assume nerve agent concentration is low and consider performing rescue for up to 30 minutes.

NOTE: Avoid transit of antechambers, stairwells, or adjacent rooms when evacuating victims discovered during RECON. These areas may have vapor, aerosol, or liquid chemical agent contamination that could further injure the victim or contribute to the rescuer's dosage.

NOTE: Take special care to avoid contaminating footwear and clothing with liquid chemical agent. Skin contact with liquid chemical agent dosage may be lethal. Liquid contamination is very easy to spread. Spread liquid contamination will "offgas" highly toxic vapors and continues as a skin contact hazard.

d. Without Rescue in Conjunction with RECON. If no living victims are seen, then leave the building immediately, seal and secure the building, and wait for the HAZMAT Team in Level A suits to arrive at the scene.

4. Victim Information

a. Location. Are casualties visible near an entrance? Are they in the line of sight? Can they be heard? Estimate how long it would take to reach and remove them.

b. Number. If there are enough HAZMAT Team personnel in Level A suits available to rescue live victims in a timely manner, use them. Otherwise, consider using personnel who are wearing an acceptable protective clothing alternative (i.e., taped or untaped turnout gear with SCBA), as approved by the Incident Commander.

c. Condition. Are casualties ambulatory or non-ambulatory? Signs and symptoms? Traumatic injuries? Entanglement? Mental state?

5. Rescue and Standby Teams. Select at least two personnel per team with appropriate personal protection. Ensure they are hydrated.

6. Chemical Agent Hazard Reduction. Consider use of PPV fans or other fans to reduce or redirect vapor or aerosol concentration. **Be sure** that use of these fans will not spread chemical agent to endanger other people. If fans are acceptable, they should be placed in service while rescuers are donning their protective ensemble.

7. Review Information about Chemical Warfare Agents. The higher the vapor pressure of a CWA, the higher its rate of evaporation (volatility). Temperature and humidity can affect CWA properties and exposure risk.

8. SCBA (Positive Pressure). SCBA **must** be used for all rescue missions. SCBA provides an inhalation Protection Factor (PF) of 10,000, and is the best. This is excellent respiratory protection and the best inhalation protection available.

9. Personal Protective Equipment (PPE). Rescue personnel must wear standard turn-out gear with SCBA. If the situation permits, PPE closures and openings should be taped with duct tape either by the responder or a buddy.

10. Rescue Team Exposure Time. Limit the initial exposure time to **12 minutes**. No entry team will reenter the contaminated area **unless authorized and extreme circumstances clearly warrant doing so**. Based on chemical warfare agent(s) released, the quantity, its properties, the circumstances surrounding its release, vapor suppression measures used, and any symptoms displayed by rescuers, the Incident Commander may allow rescue personnel to operate in the contaminated area for a longer period.

a. Caution. Because concentrations of the chemical agent released in a building could result in different concentrations in the rooms and corridors, victims should be removed through doors or windows that lead directly to the outside. If this is not possible, the rescuers should consider the use of escape masks or chemical masks by victims who must leave through other rooms and corridors to reach the outside.

b. Caution of Face Piece Removal. After exiting the rescue area, rescuers **must** continue using their SCBA until their decontamination is complete to prevent respiratory harm from "offgassing" of chemical agent from the protective clothing. If possible, remove the regulator and face piece last (after protective clothing).

11. Emergency Decontamination. Unless delay would compromise rescue, set up the decontamination area before entry is made, locate setup upwind and as close as practicable, and monitor operations. Rescuers must be decontaminated immediately and before they remove their regulator and face piece (to avoid breathing any vapors possibly trapped in their protective clothing) or any of their protective clothing. If possible, remove regulator and face piece last. Use chemical agent monitors.

12. Medical Monitoring. Check vital signs and electrocardiogram (ECG). Check again for chemical agent signs and symptoms.

C. Rehabilitation (REHAB): Provide rest and rehydration. Recheck vital signs, as necessary.

Remember this document is a **guide**. Existing conditions, knowledge of the chemical agents, and good judgment, combined with available personnel and PPE, will greatly influence what level of protection is used by rescuers. The safety of **both** the rescuers and victims is of paramount concern. When Level A suits are not available, the mission of protected rescuers is to rescue **live victims**, nothing more.

D. Determining Hazards to Firefighters

A basic issue is determining what vapor concentration a firefighter might encounter while performing rescue or reconnaissance. While an underlying assumption might be that first responders would enter a Hot Zone only to rescue living victims, some jurisdictions or ICs may want to risk entry to perform other missions such as victim search, sampling or detection, or hazard mitigation.

If a chemical agent detector capable of accurate near-real-time vapor quantification is not available and/or entry into an unknown environment for detection is not performed, the IC must operate based on other indicators. These include symptoms and reports from escaping victims and knowledge of the room size and air handling characteristics.

Determining the actual concentration of chemical agent vapor that a first responder might encounter during rescue or reconnaissance requires knowledge of the major controlling factors. These factors can be recalled using the acronym "REACT" (**R**escuer/firefighter protective equipment, **E**nvironment, **A**gent unique factors, **C**oncentration, and **T**ime). When these factors are not known, the IC must assume, tacitly or wittingly, one or more of these significant parameters in making a decision on operating within the Hot Zone.

1. Rescuer (Firefighter Personal Protective Equipment). The IC must consider the availability of higher protective PPE configurations and the speed of donning PPE weighed against the risk of danger to each firefighter and the volume and criticality of rescue needs.

2. Environment. The behavior of vapor-laden air within each enclosed environment is important to the speed that the vapor hazard changes. If no active measures are taken to remove or mitigate the vapor and/or vapor source within a room, the existing air handling conditions will dictate how the level of hazard reduces or builds. This hazard will reduce most rapidly with high ventilation and good mixing within a room with smaller volume.

Another important factor is the amount of air mixing within the room. However, the amount of mixing will depend on the rate, type, and location of chemical agent dissemination, total and local air exchange rates, and the time elapsed since the event. For example, with a spill inside an auditorium, the concentration of chemical agent in the direct vapor transport path from the spill to the room air-conditioning exhaust will be higher than areas with relatively more "dead" air further away from the spill site. Firefighters may be able to avoid such areas, either by inspection or by introducing a small amount of smoke to quickly characterize local air movement platforms.

3. Agent-Unique Factors. Each chemical agent has known toxicity and volatility. Toxicity is a measure of the amount of exposure (dosage) that will induce various levels of incapacitation or death. Volatility is a measure of how much chemical agent a given air mass can hold at a given temperature (concentration) and is one component of the rate of evaporation of liquid or aerosol into that air mass as vapor.

4. Concentration. If an air mass is not saturated with chemical agent vapor (holding as much as it can hold), then the vapor hazard may be limited by the amount or dissemination method for the chemical agent employed. This is intuitive; smaller and less efficient devices may present lower hazards.

Without a detector capable of quantifying agent concentration or other physical evidence such as victim symptoms, the amount and dissemination method for each chemical agent must be assumed.

5. Time. Both the time since the event and the exposure duration time for each first responder are major factors for operating in the Hot Zone. These factors are also the most controllable by the potential IC. In general, risks to first responders will be lower the longer the delay before entry and the shorter the entry duration.

Acknowledgement: Montgomery County Fire and Rescue Service (MCFRS), Montgomery County, MD. Prepared by Deputy Chief Ted Jarboe, and District Chief Robert Stephan, and Captain Jack Crowley with technical review by Roger McIntosh, MD.

NOTES

THIS PAGE IS INTENTIONALLY LEFT BLANK

ANNEX B

MEDICAL TREATMENT PROTOCOLS

(Guidelines Developed to Support the 1996 Summer Olympic Games)

INDEX

Page

Chlorine
B-3 Factsheet
B-4 Treatment Protocol

Hydrocyanic Acid – Hydrogen Cyanide and Cyanogen Chloride
B-7 Factsheet
B-8 Treatment Protocol

Methyl Isocyanate, Methylene Bisphenyl Isocyanate, and Methylene Diisocyanate – MDI
B-11 Factsheet
B-13 Treatment Protocol

Mustard (Sulfur Mustard)
B-15 Factsheet
B-17 Treatment Protocol

Nerve Agents
B-19 Factsheet
B-20 Treatment Protocol

Phosgene – Carbonyl Chloride
B-23 Factsheet
B-24 Treatment Protocol

B-26 **Atropine - Dosage Chart at 0.1 mg/ml and 0.4 mg/ml**

B-27 **Atropine - Dosage Chart at 1 mg/mL and 2 mg/mL**

B-28 **Pralidoxime – Dosage Chart at 50 mg/mL (for IV Use) and Dosage Chart at 300 mg/mL (for IM Use)**

B-29 **Amyl Nitrite - Dosage Instructions and Sodium Nitrite Dosage Chart at 3% (300 mg/10 mL)**

INDEX
(Continued)

Page

B-29 **Sodium Thiosulfate - Dosage Chart at 25% Concentration (Pediatric 1.65 mL/kg, Adult 50 mL)**

Anthrax
B-31 Factsheet
B-32 Treatment Protocol

Botulinum Toxins
B-33 Factsheet
B-34 Treatment Protocol

Cholera
B-35 Factsheet
B-36 Treatment Protocol

Plague
B-39 Factsheet
B-40 Treatment Protocol

Q Fever
B-43 Factsheet
B-44 Treatment Protocol

Salmonella
B-45 Factsheet
B-46 Treatment Protocol

Staphylococcal Enterotoxin B
B-49 Factsheet
B-50 Treatment Protocol

FACTSHEET

Chlorine

Military Designation: None

Description: Chlorine is found as an amber liquid or greenish-yellow gas with a very characteristic irritating, pungent odor. Chlorine is severely irritating to the skin, eyes, and respiratory tract. Although generally stored as liquid, when released, the resulting gas is about two times heavier than air.

Non-Military Uses: Chlorine is used widely in industrial settings in the organic synthesis and manufacture of antifreeze agents, solvents, refrigerants, resins, bleaching agents, and other inorganic chemicals. There is an exceptionally wide use of chlorine in noncommercial and home settings as a cleaning agent, bleaching agent, and bacteriostatic and disinfecting agent. Storage of this substance in a variety of liquid and granular forms is widespread.

Military Use: Chlorine was first used by the German military on April 22, 1915, in a cylinder-released gas attack that resulted in an estimated 15,000 Allied wounded and 5,000 Allied deaths. Because of its tendency to dissipate rapidly, very large concentrations were required. Chlorine was weaponized in projectiles, mortars, and bombs. There is no current chlorine weaponry.

Health Effects:

- Chlorine exposure causes an immediate severe irritation to the eyes and mucous membranes.
- The upper airways are first involved with nose, throat, and sinus irritation.
- The lower airways are irritated with severe cough and chest pain. There may be nausea, vomiting, and fainting.
- Very high doses may cause excess fluid to develop in the lungs (pulmonary edema).
- Wheezing respiration is likely to occur in individuals with previous asthma.
- Bronchitis often occurs, sometimes progressing to pneumonia.
- Chronic exposures may increase the susceptibility to respiratory infections.
- High concentrations also irritate the skin, causing burning, itching, and occasional blister formation. There is no animal or human epidemiologic data suggesting that chronic chlorine exposure may cause cancer or the occurrence of adverse developmental effects in the unborn fetus.

Environmental Fate: Chlorine is not persistent in surface water, groundwater, or soil. Oxidation of environmental organic materials occurs rapidly, reducing its concentration rapidly. Dispersal of chlorine gas is rapid to the atmosphere.

TREATMENT PROTOCOL
Chlorine

1. General

Chlorine is found as a greenish-yellow gas. There is a pungent, acrid, characteristic odor. Sensitivity to the odor is below toxic levels; however, since some sensory adaptation occurs, repeat exposures are more likely to produce toxic effects. Exposures irritate eyes and central (upper) airways within minutes. Low doses produce some cough and choking sensation. Moderate doses also produce a sense of suffocation, hoarseness, and substernal pain. High doses also produce a severe dyspnea, with pulmonary edema, nausea, vomiting, and headache; syncope also seen. Very high doses may produce sudden death without obvious pulmonary lesions—possibly via laryngospasm. All recognized exposures should be referred for direct observation/care.

2. Patient Evaluation

a. Victim should be immediately removed from the toxic environment by fully masked (SCBA) personnel. Chemically protective clothing is required for liquid/solution exposures.

b. Liquid contamination causes eye and skin burns on contact. Contaminated clothing should be removed/disposed of.

3. Treatment

a. Eyes: Liquid exposures should be flushed with copious quantities of water; medical attention should be sought. Gas exposures, if symptomatic, should be flushed with water. Medical attention should be sought if symptomatic.

b. Skin: Liquid exposures should be flushed with copious quantities of water. Contaminated clothing should be removed/disposed of. Gas exposures require no specific therapy unless symptomatic. Intense gas exposure produces burns; wash with water.

c. Breathing: Evaluate respiration, cyanosis, bronchospasm.

If apnea: Cardiopulmonary resuscitation (CPR) with intubation. Be aware that laryngospasm may be present with intense exposures, hence intubation may be very difficult and tracheostomy could be required. Medical attention should be sought.

If stridorous/hoarse: Consider intubation under direct vision since laryngospasm may be imminent (see above). Medical attention should be sought.

If dyspnea/cough/chest tightness: Consider intubation for impending pulmonary edema. Also consider possible bronchospasm sufficiently severe to have so little air exchange that wheezes are absent. Medical attention should be sought. Codeine-containing demulcents may help. Be wary of sedation.

NOTE: The anatomical configuration of infants' and children's airways makes wheezing a less reliable indicator of bronchospasm. Severe smaller airway constriction with resultant hypoxia may be present. Any apparent infant or child distress should be immediately assessed with oximetry.

If bronchospasm: Provide aggressive bronchodilation.

Adult

Inhaled albuterol: unit dose every (q) 2 hr.

Steroids: methylprednisolone, load 120 mg, then 60 mg q 6 hr.

Theophylline: load 150 mg, then 30 mg/hr.

Infants and Children (0-12 yr)

Inhaled albuterol: 0.15 mg/kg per nebulized dose, up to 5 mg/20 minutes for first 2 hr.

Steroids: methylprednisolone: 1 mg/kg q 6 hr.

Theophylline: 10 mg/kg/24 hr.

Elderly

Inhaled albuterol: unit dose q 3 hr.

Steroids: methylprednisolone, load 125 mg, then 60 mg q 6 hr.

Theophylline (occasional use): load 100 mg, then 25 mg/hr.

If pulmonary edema (occurs with very severe exposures): Treat as noncardiac pulmonary edema (Adult Respiratory Distress Syndrome or ARDS) with PEEP 5 to 7 cm and/or intubation. Diuretic therapy risks severe hypotension if intubation is required.

If infection: Inhalation exposures may produce pulmonary infiltrates, fever, and white blood cell elevations leading to an erroneous diagnosis of (presumed bacterial) pneumonia. Prophylactic antibiotics are not indicated. Surveillance bacteriologic cultures are obtained anticipating an approximately 50 percent risk of nosocomial pneumonia at days 3 to 6.

If pain: Airway discomfort may benefit from codeine. Be wary of sedation.

THIS PAGE IS INTENTIONALLY LEFT BLANK

FACTSHEET

Hydrocyanic Acid – Hydrogen Cyanide and Cyanogen Chloride

Military Designations: AC (hydrocyanic acid) and CK (cyanogen chloride)

Description: Both of these substances are liquid, but they vaporize (evaporate) at about 73 ^{o}F and 58 ^{o}F, so they will be in the gaseous form under most temperate conditions. AC has an odor of bitter almonds; CK is pungent. AC vapor is lighter than air, whereas CK gas is heavier than air. Cyanogen chloride is quickly metabolized to cyanide once absorbed into the body and causes the same biological effects as hydrogen cyanide. In addition, CK is irritating to the eyes, nose, and throat (similar to riot control agents), whereas AC is nonirritating.

Non-Military Uses: Large amounts of cyanide (most in the form of salts) are produced, transported, and used by U.S. industry annually. Cyanide is used in fumigation, photography, extraction of metals, electroplating, metal cleaning, tempering of metals, and the synthesis of many compounds. It is released when synthetic fibers and plastics burn.

Military Uses: The French and the English used small amounts of cyanide during World War I, but the compound was not effective as a weapon because the amount needed is large (and small munitions were used) and because cyanide, being lighter than air, drifted away from the target. Japan allegedly used cyanide against China before World War II, and Iraq allegedly used cyanide against the Kurds in 1988. The United States once had cyanide munitions, but the known ones have been destroyed. However, some of these munitions may have been abandoned at sites around the United Sates. Small amounts of cyanogen chloride were incorporated in chemical agent identification sets, which were also abandoned.

Health Effects:

- Cyanide blocks the use of oxygen in cells of the body and thus causes asphyxiation in each cell. The cells of the brain and the heart are most susceptible to oxygen lack.
- High concentrations of vapor may cause a brief increase in rate and depth of breathing (in 15 seconds), seizures (30 seconds), and cessation of breathing (3 to 5 minutes) and of cardiac activity (4 to 10 minutes), and death.
- A smaller concentration will cause headache, flushing, light-headedness, and other nonspecific effects. (In addition, CK produces irritation of the eyes, the nose, and the airways.) Antidotes (nitrites and thiosulfate) are very effective if administered in time.
- A large exposure may result in prolonged neurologic damage, probably because of hypoxia. Chronic ingestion of cyanide-containing foods (e.g., cassava, which is a staple in many parts of Africa) has been associated with thyroid and nerve disturbances. Evidence does not suggest that cyanides are carcinogenic.

Environmental Fate: Because of their volatility, these substances are not expected to persist in surface water or soil.

TREATMENT PROTOCOL
Hydrocyanic Acid – Hydrogen Cyanide and Cyanogen Chloride

1. General

a. Patient should be removed from the toxic environment immediately.

b. These substances are very volatile, so there is little need for decontamination if exposure was to vapor alone. If liquid was present, remove patient's clothing and wash liquid off skin.

c. The effects of vapor from either form of cyanide appear within seconds to a minute. If patient has no or only mild effects when seen 5 to 30 minutes after exposure, he will need no treatment.

d. Severe cyanide poisoning produces metabolic acidosis. If cyanide poisoning is suspected in a patient who does not have moderate or severe acidosis, treatment for cyanide poisoning should not be delayed, but the diagnosis should be reconsidered.

2. Patient Evaluation: Level of consciousness, respiratory rate, heart rate.

a. Exposure to a high concentration: transient hypepnea, followed by convulsions (30 seconds after exposure), gradual decrease in respiratory rate and depth to apnea (3 to 5 minutes), and cessation of cardiac activity (5 to 8 minutes).

b. Exposure to lower concentration: Flushing, headache, anxiety, agitation, vertigo, feeling of weakness, nausea, and muscular trembling (cyanogen chloride may cause irritation of eyes, nose, and airways). Prolonged exposure may lead to effects listed above.

c. Odor of bitter almonds may be detected (half of the population cannot smell this); normal pupils (may be dilated in terminal stage); "cherry-red" skin (may not be present); diaphoresis; and venules in fundus are same color as arterioles. Cyanosis occurs only after circulatory collapse and apnea.

3. Treatment

a. For a mild exposure (conscious and breathing): Observe; no antidotes; oxygen may be given to young or old or in presence of heart disease in a patient with mild symptoms.

b. Severe exposure (unconscious, not breathing): Should immediately receive 100 percent oxygen. Cardiac monitoring and evaluation of oxygen saturation should be done when possible. (Saturation will be normal even in severe casualty until terminal stage; however, additional oxygen may assist in therapy.) Antidotes should be administered as soon as possible (see below). It is important to note that pulse oximeter results are completely unreliable in the setting of methemoglobinemia, which is inducted by amyl nitrite or sodium nitrite therapy.

c. For a severe exposure: Ventilate using bag-valve-mask with one ampule of amyl nitrite (crushed) in bag; after several minutes, add another (crushed) ampule; keep adding an ampule every several minutes. This is a temporary measure until intravenous (IV) drugs can be given, but it may assist in recovery.

d. Administer 300 mg (10 ml) of sodium nitrite IV over 5 minutes. Flush line. (Children's dose: 0.2 to 0.3 mil/kg, or 6 to 9 mg/kg of the 3 percent solution. No separate recommendation for infants. For elderly, use adult dose unless small and frail.) Be aware: Nitrites produce orthostatic hypertension, but a patient who can stand does not need them.

e. Follow with 12.5 grams (50 ml) of sodium thiosulfate IV. (Children's dose: 0.4 mg/kg, or 1.65 ml/kg of the 25 percent solution. No separate recommendation for infants. Adult dose should be used for elderly unless they are small and frail. Use care giving nitrate in a patient with hypertension or heart disease.) (Amyl nitrite, sodium nitrite, and sodium thiosulfate are in the Pasadena [formerly Lilly] Cyanide Antidote Kit, the latter two in ampules of 300 mg/10 ml and 12.5 grams/50 ml.) Use one-half dose in 20 minutes if no improvement. See instructions on top of Antidote Kit box.

f. If patient continues to remain apneic, intubate and continue oxygen through tube with assisted ventilation.

g. Transfer apneic or unconscious patients to medical facility.

h. Patients often recover rapidly unless central nervous system (CNS) hypoxia has occurred.

4. Laboratory Issues

a. Metabolic acidosis is common; should be treated with bicarbonate.

b. Monitor arterial pO_2; should be normal until near-terminal stage.

THIS PAGE IS INTENTIONALLY LEFT BLANK

FACTSHEET

Methyl Isocyanate, Methylene Bisphenyl Isocyanate, and Methylene Diisocyanate - MDI

Military Designations or Military Unique Use: None

Description: Methylene Bisphenyl Isocyanate (MDI) is found as a solid in white to yellow flakes. Various liquid solutions are used for industrial purposes. There is no odor to the solid or the liquid solutions. The vapor is approximately eight times heavier than air. This chemical is a strong irritant to the eyes, mucus membranes, skin, and respiratory tract. This chemical is also a very potent respiratory sensitizer.

Non-Military Uses: Very large quantities of MDI are produced, transported, and used annually in the United States. Various industrial processes utilize MDI in production and usage of (poly)urethane foams, lacquers, and sealants. MDI is a commonly used precursor in the industrial production of insecticides and laminating materials. Noncommercial uses of polyurethanes, such as in isocyanate paints or in cutting of uncured urethanes, may also cause exposure. Thermal degradation of these substances may produce MDI as a combustion byproduct.

Health Effects:

- MDI as either a solid or liquid solution is a strong irritant to the eyes and the skin, resulting in discomfort and burning sensation.
- Severe inflammation may occur.
- Irritation of the respiratory tract results in cough, shortness of breath, and chest pain. Very high concentrations may irritate the respiratory tract sufficiently to cause excess fluid accumulation within the lung, resulting in very severe respiratory distress and pulmonary edema. MDI vapor is a strong sensitizer of the respiratory tract.
- In some individuals, particularly those with a prior history of asthma, repetitive exposures, even to very low doses, may trigger an asthmatic episode. Such sensitized individuals may also experience asthma with subsequent skin or eye exposures. This sensitization may persist indefinitely.
- Repeated or long-term exposure may result in permanent respiratory problems
- Repeated or long-term exposure of the skin may cause a skin rash. There are no animal or human epidemiologic data that suggest that chronic MDI exposure may cause cancer or the occurrence of adverse developmental effects in the unborn fetus.

Environmental Fate: Since the reported vapor pressure of Methyl isocyanate (MIC) is 348 mm Hg at 20 ^{o}C, MIC is expected to remain almost entirely in vapor phase when released into the atmosphere. MIC is susceptible to hydrolysis and photooxidation in the atmosphere with a half-life of 11 days at an atmospheric concentration of 5.0E+5 hydroxyl radicals/M^{3}. In the aquatic media, MIC is rapidly hydrolyzed with half-lives of 20 and 9 minutes at 14 ^{o}C and 25 ^{o}C, respectively. The products of hydrolysis-N-carboxymethylamine, methylamine, carbon dioxide, and N,N^{1}-dimethylurea are nontoxic. Due to its rapid hydrolysis in aqueous media,

MIC is not expected to bioconcentrate or bioaccumulate in the environment. MIC released to soil is hydrolyzed, and the degradative process is rapid in the presence of moisture. Hydrolysis minimizes adsorption and volatilization of MIC from the soil, although these conditions are favorable for its mobility. Depending upon the concentration of MIC in soil and prevailing moisture conditions, volatilization from the surface soil may be a significant environmental transport and fate process.

TREATMENT PROTOCOL
Methyl Isocyanate, Methylene Bisphenyl Isocyanate, and Methylene Diisocyanate – MDI

1. General

MDI is found as a solid that has a melting point of 37 ^{o}C. Vapor exposures occur with liquids containing dissolved solid. Gas exposures may occur with high-temperature volatilization. Thermal decomposition produces carbon monoxide and oxides of nitrogen. Sensitivity to this substance (eye, nose irritation) occurs at concentrations five times higher than Occupational Safety and Health Administration (OSHA) limits (0.2 mg/m^3); hence, toxic exposures may go unrecognized. Exposures lead to:

Irritant Effects: Eyes, mucous membranes, and skin may be irritated, particularly with prolonged, repetitive, or intense exposures. High concentrations may also produce cough, dyspnea, and lethal pulmonary edema.

Sensitizing Effects: Respiratory sensitization may occur, particularly in individuals with known asthma, allergies, or recognized isocyanate sensitivity.

2. Patient Evaluation

Victim should be immediately removed from the toxic environment by personnel in chemically protective clothing. Vapor or gas hazards should be anticipated with full (positive pressure) masks. Liquid/solid contamination should be corrected by clothing removal and soap and water decontamination.

3. Treatment

a. Eyes: There is no specific therapy appropriate. Liquid/solid exposures should be irrigated with copious quantities of water. Subsequently symptomatic individuals should seek medical attention.

b. Skin: There is no specific therapy appropriate. Liquids/solids should be removed with soap and water. Single exposures are unlikely to create rashes unless previously sensitized. Intense exposure may produce a dermatitis and require referral.

c. Swallowing: Liquids/solids should be removed by induced vomiting in the conscious victim or by lavage otherwise.

d. Breathing: Symptoms due to sensitivity may be delayed up to 8 hours after exposure. Respiratory symptoms may appear with skin, ocular, or gastrointestinal (GI) exposure in previously sensitized individual.

If apneic: CPR, may require intubation for pulmonary edema. Consider severe brochospasm in previously sensitized victim.

If stridorous/hoarse: Consider intubation under direct vision.

If dyspnea/cough/chest tightness: Consider intubation for impending pulmonary edema. Also consider possible bronchospasm sufficiently severe to have so little air exchange that wheezes

are absent. Medical attention should be sought. Codeine-containing demulcents may help. Be wary of sedation.

NOTE: The anatomical configuration of infants' and children's airways makes wheezing a less reliable indicator of bronchospasm. Severe smaller airway constriction with resultant hypoxia may be present. Any apparent infant or child distress should be immediately assessed with oximetry.

If bronchospasm: Treat as asthma with inhaled albuterol. Bronchospasm may be particularly severe, especially in previously sensitized individuals.

Dosage Chart - Methyl Isocyanate, Methylene Bisphenyl Isocyanate, and Methylene Diisocyanate – MDI

Treat aggressively.

Adults

Inhaled albuterol: unit dose q 2 hr. or continuous neb 15 g/hr.

Steroids: methylprednisolone load 120 mg, then 80 mg q 6 hr.

Theophylline: load 150 mg, then 30 mg/hr.

Infants and Children (0-12 yr)

Inhaled albuterol: 0.15 mg/kg per nebulized dose, up to 5 mg/20 minutes for first 2 hr.

Steroids: methylprednisolone: 1 mg/kg q 6 hr.

Theophylline: 10 mg/kg/24 hr.

Elderly

Inhaled albuterol: unit dose q 3 hr.

Steroids: methylprednisolone, load 125 mg, then 60 mg q 6 hr.

Theophylline (occasional use): load 100 mg, then 25 mg/hr.

Upper airway obstruction: This is rarely seen and only with intense exposures.

Hoarseness and stridor suggest impending laryngospasm: Consider intubation under direct supervision.

If pulmonary edema (may rarely occur with intense exposures): Treat as noncardiac pulmonary edema (Adult Respiratory Distress Syndrome or ARDS; see PHOSGENE).

FACTSHEET

Mustard (Sulfur Mustard)

Military Designations: H; HD; HS

Description: Mustard is a "blister agent" that causes cell damage and destruction. It is a colorless to light yellow to dark brown, oily liquid with the odor of garlic, onion, or mustard. It does not evaporate readily, but may pose a vapor hazard in warm weather. It is a vapor and liquid hazard to skin and eyes and a vapor hazard to airways. Its vapor is five times heavier than air.

Non-Military Uses: Sulfur mustard has been used as a research tool to study deoxyribonucleic acid (DNA) damage and repair. A related compound, nitrogen mustard, was the first cancer chemotherapeutic agent and is still used for some purposes.

Military Use: Mustard was used extensively in World War I and was the largest chemical casualty producer in that war. Mustard was used by Iraq against Iran in the 1980s. The United States has a variety of munitions filled with sulfur mustard, including projectiles, mortars, and bombs. It is also in chemical agent identification sets (which may be on abandoned sites) and in ton containers.

Health Effects:

- Mustard damages DNA cells, which leads to cellular damage and death.
- Mustard penetrates skin and mucous membranes very quickly, and cellular damage begins within minutes.
- Despite cellular damage, clinical effects do not begin until hours later; the range is 2 to 24 hours, but usually 4 to 8 hours.
- The initial effects are in the eyes (itching or burning); the skin (erythema with itching and burning); and airways (epistaxis, hoarseness, sinus pain, cough).
- After high doses, these may progress to more severe effects in the eyes (corneal damage), skin (blisters), and damage to the lower airways (dyspnea and productive cough).
- After absorption of a large amount, there may be damage to the gastrointestinal tract (vomiting, diarrhea) and bone marrow (damage to stem cells with cessation of production of white cells, red cells, and platelets).
- There is no antidote. Epidemiological studies indicate that frequent exposure to mustard over years may cause an increased incidence of cancer of the upper airways.
- An acute exposure may cause persistent damage to airways (stenosis) and eyes (keratitis). Animal studies suggest that mustard may have developmental effects.

Environmental Fate: Persistence of mustard in soil will depend on the soil type, the amount of mustard, the depth of contamination, and weather conditions. Mustard contamination of surface soil may persist for weeks, and deeper soil may remain contaminated for years. Mustard is relatively insoluble in water; once dissolved, however, it breaks down into less toxic

products. Because of its relatively rapid hydrolysis once in solution, mustard is not thought to be transported through the soil by groundwater.

TREATMENT PROTOCOL
Mustard (Sulfur Mustard)

1. General

a. Mustard causes no immediate effects. The initial clinical effects of mustard (which usually involve the eyes, the skin, and the airways) appear 2 to 24 hours (usually 4 to 8 hours) after exposure to liquid mustard or to mustard vapor. However, liquid or vapor mustard penetrates the skin and mucous membranes and damages cells within minutes of exposure, so decontamination must be done immediately after exposure.

b. The patient should be immediately removed from the toxic environment.

c. If liquid contact, clothing should be removed and skin decontaminated with 0.5 percent hypochlorite (1 part household bleach mixed with 9 parts water), soap, and cool water, or thoroughly flushed with water alone. Eyes should be flushed with large amounts of saline. If exposure is to vapor alone, remove clothing.

d. If there is a history of definite exposure, patient should be taken to medical facility for observation.

2. Patient Evaluation: Initial effects (usually 2 to 24 hours after exposure).

a. Eyes: Irritation, feeling of grit in eye, redness.

b. Skin: Erythema (will progress to blisters 1 to 4 hours later if exposure was large).

c. Airways: Irritation of nose, voice change, sinus pain, hacking cough. (Very rarely a patient might inhale an extremely large amount and start to have these effects plus dyspnea within 2 hours. This patient should be intubated, and assisted ventilation with oxygen should be started. This patient should be taken to the nearest pulmonary intensive care unit as quickly as possible.)

3. Treatment

a. There is nothing to do for these patients until effects appear except to decontaminate. Tissue is damaged within minutes, so decontamination must be done immediately.

b. Eyes: Any commercial eye solution may relieve the irritation from a mild exposure. More severe effects: A mydriatic twice a day (b.i.d.) or four times a day (q.i.d.) (depending on the length of action of the drug); a topical antibiotic b.i.d.; vaseline on lid edges b.i.d.; sunglasses if photophobia is present. Topical steroids within the first 24 hours only may reduce inflammation. Control pain with systemic, not topical, analgesics. Visual loss is usually due to lid edema and blepharospasm, not eye damage.

c. Skin: A soothing lotion (e.g., calamine) for erythema. Leave small blisters intact. Unroof large blisters and irrigate denuded area at least three times a day (t.i.d.) followed by liberal application of topical antibiotic. Watch for infection. Fluid requirements are much less than those for thermal burns; do not overhydrate.

d. Airways: Steam inhalation and cough suppressants will generally relieve mild symptoms. A chemical pneumonitis (increased temperature, white blood count [WBC], chest x-ray findings) may develop after large exposure: intubation, assisted ventilation with oxygen (and possibly with PEEP or continuos positive airway pressure [CPAP]); bronchodilators; watch sputum at least daily for organisms (no antibiotics until organism is identified).

e. Systemic absorption of a large amount of mustard may cause bone marrow and gastrointestinal tract damage. Watch WBC, hematocrit (Hct) daily; mustard damages bone marrow.

FACTSHEET

Nerve Agents

Military Designations: GA, GB, GD, GF, and VX
Common Names: Tabun (GA); Sarin (GB); Soman (GD). None for GF and VX.

Description: Nerve agents are very toxic organophosphorus compounds that have biological activity similar to that of many insecticides. Their volatilities range from that of water to that of motor oil; they present a hazard from vapor and liquid. Under temperate conditions, the liquids are clear, colorless, and mostly odorless. They cause biological effects by inhibiting acetylcholinesterase, thereby allowing acetylcholine to accumulate and cause hyperactivity in muscles, gland, and nerves.

Non-Military Uses: There is no non-military use. Threat of human exposure exists in research laboratories, in storage facilities, and from terrorists.

Military Use: Nerve agents were first synthesized pre-World War II, but were not used in that war. They were used by Iran in its war with Iraq. The United States has a large stockpile of GA and VX in weapons; these are being destroyed.

Health Effects:

- Nerve agents are the most toxic chemical agents.
- Initial effects from small amounts of agent differ depending on route of exposure. After a small vapor exposure, there is the immediate onset of effects in the eyes (small or pinpoint pupil [mitosis], redness, eye pain, dim vision), the nose (rhinorrhea), and airways (some degree of shortness of breath because of bronchoconstriction and secretions). After a small liquid exposure, there may be an asymptomatic interval of up to 18 hours before the onset of sweating and fasciculations at the site of the droplet, which may be followed by nausea, vomiting, and diarrhea.
- After exposure to a large amount of nerve agent by either route, there is sudden loss of consciousness, convulsions, copious secretions, apnea, and death. There is usually an asymptomatic interval of minutes after liquid exposure before these occur; effects from vapor occur almost immediately.
- Antidotes (atropine and pralidoxime) are effective if administered before circulation fails. There is no evidence that nerve agents cause cancer or developmental effects.

Environmental Fate: GB will react with water to produce toxic vapors. Open-pit burning or burying is prohibited. GB mixes with water and would be mobile in surface and groundwater should a release occur; however, because of its rapid hydrolysis, it is not a long-term water contaminant of concern. Most GB spilled will be lost by evaporation; because of this there is no long-term impact on health and environment. VX is moderately persistent in soil, and because it has low water solubility, it could be mobile in surface and groundwater systems.

TREATMENT PROTOCOL
Nerve Agents

1. General

Nerve agents are extremely toxic chemicals that cause effects by inhibiting the enzyme acetylcholinesterase, allowing excess acetylcholine to accumulate. This excess neurotransmitter then produces overstimulation and causes hyperactivity in muscles, glands, and nerves. The nerve agents are GA (tabun), GB (sarin), GD (soman), GF, and VX. Their effects are identical.

Remove patient from contaminated atmosphere. If exposure was to vapor, remove clothing; if exposure was to liquid, remove clothing and wash skin with 0.5 percent hypochlorite (1 part household bleach and 9 parts water), soap and water, or thoroughly flush with water alone.

2. Patient Evaluation

If conscious, note ventilatory status and ask about nausea. If unconscious, note ventilatory status and heart rate (heart rate may be high, low, or normal in a nerve agent casualty).

Initial effects differ depending on whether exposure was to vapor or to liquid.

a. Vapor: Effects start within seconds to a minute or two.

(1) Mild to Moderate: Miosis (possible redness in eye, eye pain, complaints of dim or blurred vision), nausea, rhinorrhea, excess secretions, dyspnea (mild to severe).

(2) Severe: Loss of consciousness, seizures, apnea, flaccid paralysis.

b. Liquid: Effects start in minutes (large exposure) to 18 hours (small exposure) after an asymptomatic interval.

(1) Mild to Moderate: Sweating and fasciculations at site of exposure; nausea; vomiting; diarrhea; weakness.

(2) Severe: Same as for vapor, but after a 1- to 30-minute asymptomatic interval.

3. Treatment

a. Initial Management

(1) Mild to Moderate: Dyspnea should be treated with one or two doses of atropine intramuscular (IM) or IV and 1 dose of pralidoxime (IV drip) initially, depending on severity of the dyspnea. **See paragraph b below for size of dose.** This should be supplemented with oxygen, particularly in infants, young children, and the elderly; healthy older children and adults will usually do well without it unless they have pulmonary or cardiac disease. Atropine dose

should be repeated at 7- to 10-minute intervals until improvement is noted. Failure to respond (i.e., no dry mouth, no decrease in secretions) confirms the need to administer additional doses of atropine. Gastrointestinal effects after liquid exposure are treated in the same manner. Do not treat for miosis (unless eye pain is severe) or rhinorrhea (unless severe).

(2) Severe: Administer 3 doses of atropine IM (not IV in hypoxic patient) and start 1 dose of pralidoxime by slow (20 minutes) IV drop. [More rapid administration will cause hypertension.] **See paragraph b below for size of dose.** Intubate and ventilate with oxygen (initial ventilation will be difficult because of airway resistance; atropine will relieve this). Administer diazepam if convulsing. Suction for secretions. Repeat 1 dose of atropine (IM until hypoxia is improved, then IV) every 5 minutes until (a) secretions diminish or (b) airway resistance is less or is normal. Failure to respond (i.e., no dry mouth, no decrease in secretions) confirms the need to administer additional doses of atropine. Monitor via pulse oximeter; cardiac monitoring should also be done (cardiac arrhythmias are uncommon after atropine is given). Acidosis may develop after seizures or after period of hypoxia and will require therapy. This patient should be transported to a hospital after stabilization (adequate drug therapy and initiation of ventilation).

(3) Eyes: Do not treat miosis unless eye/head pain is severe. Use topical, not systemic, anticholinergic to relieve pain.

b. Recommended Doses (see DOSAGE CHART on page B-27)

c. Further Care

(1) Mild to Moderate: After vapor exposure, a patient who is breathing normally does not need to be hospitalized as he will not worsen. However, miosis should be followed until eyes are normal (4 to 6 weeks). After liquid exposure, a patient should be observed in hospital for 18 hours until all agent is absorbed from skin.

(2) Severe: Continue to ventilate and to administer atropine following guidelines above. Treat acidosis if present. If patient has not had prolonged hypoxia, recovery of an unconscious patient will be gradual over 1 to 3 hours.

THIS PAGE IS INTENTIONALLY LEFT BLANK

FACTSHEET

Phosgene – Carbonyl Chloride

Military Designation: CB

Description: Phosgene is a highly reactive halogenated compound. It is found as a colorless liquid or colorless or white (by hydrolysis in air) gas. It has an odor of newly mown or moldy hay. It is primarily a vapor hazard at high concentrations to the upper respiratory tract, with severe irritation, and at lower concentrations to the lower respiratory tract, with pulmonary edema. Phosgene vapors are heavier than air, but are not persistent.

Non-Military Uses: Phosgene is an industrially extremely important substance for purposes of chemical synthesis. Large quantities are stored and transported within the continental United States. Materials such as foamed plastics, insecticides, and aniline dyes are products of its use. These substances and many other halogenated hydrocarbons (e.g., carbon tetrachloride, methylene chloride, degreasing agents), if combusted, produce phosgene as a degradation byproduct.

Military Use: Phosgene was first used by the Germans as a toxic war gas on December 19, 1915. By some estimates, phosgene accounted for 85 percent of World War I chemical deaths. Phosgene was generally dispersed in combination with other agents (e.g., chlorine) due to its relatively low rate of evaporation from the liquid state.

Health Effects:

- Phosgene gas at high concentrations may cause immediate irritation of the eyes and upper respiratory tract (nose, larynx, trachea). This effect is thought to be due to breakdown of the gas to hydrochloric acid with water vapor contact.
- After resolution of this irritation, a symptom-free period may occur. During this period, progressive damage to the walls of the small lung blood vessels (capillaries) allows fluids to leak from those vessels and gradually compromise lung function.
- The individual complains of progressive cough, chest tightness, and shortness of breath. Frothy secretions typical of pulmonary edema occur. This can be so rapid as to cause death if the early symptoms are not respected.
- If recovery is not complicated by infection, permanent lung damage is not likely to occur. There are no recognized long-term health risks from repetitive/chronic low-dose exposure. There are no data suggesting adverse effects on the unborn fetus.

Environmental Fate: Phosgene is not persistent in surface water, groundwater, or soil containing moisture because of its rapid breakdown into carbon dioxide and hydrochloric acid. Phosgene is not persistent in dry soil because of its tendency to evaporate readily.

TREATMENT PROTOCOL
Phosgene – Carbonyl Chloride

1. General

Phosgene may be found as a colorless liquid or a colorless-to-white gas. There is an odor of newly mown or moldy hay. Sensitivity to the odor may degrade, making individuals unaware of toxic inhalation. High-intensity exposure irritates eyes and upper airways within minutes. Lower-dose exposures may produce a lethal pulmonary edema with a characteristic symptom-free or "latent" period up to 48 hours later. Some pulmonary symptoms may appear as late as 72 hours after exposure. All recognized exposures should be referred for direct, in-hospital observation and care.

2. Patient Evaluation

a. Victim should be immediately removed from the toxic environment by fully masked personnel (full-face, positive pressure apparatus).

b. Liquid contamination does not require additional protection for rescue personnel insofar as there are minimal topical effects to the skin and no substantial dermal absorption. Contaminated clothing should be removed.

3. Treatment: Maintain at reset at least 6 hours.

a. Eyes: Liquid exposures should be flushed with copious quantities of water. Medical attention should be sought. Gas exposures, if symptomatic, should be flushed with water. Medical attention should be sought if symptomatic.

b. Skin: Liquid exposures should be flushed with copious quantities of water; contaminated clothing should be removed/disposed. Gas exposures require no specific therapy unless symptomatic.

c. Swallowed: Do not induce vomiting. Medical attention should be sought.

d. Breathing: Evaluate respiration, cyanosis. Oxygen always used.

If apneic: CPR with intubation. Be aware that laryngospasm may be present with intense exposures; hence, intubation may be very difficult and tracheostomy required. Medical attention should be sought.

If stridorous/hoarse: Consider intubation under direct vision since laryngospasm may be imminent (see above). Medical attention should be sought.

If dyspnea/cough/chest tightness: Consider intubation for impending pulmonary edema. Also consider possible bronchospasm sufficiently severe to have so little air exchange that wheezes are absent. Medical attention should be sought. Codeine-containing demulcents may help. Be wary of sedation. **NOTE:** Cough may presage pulmonary edema.

NOTE: The anatomical configuration of infants' and children's airways makes wheezing a less reliable indicator of bronchospasm. Severe smaller airway constriction with resultant hypoxia may be present. Any apparent infant or child distress should be immediately assessed with oximetry.

If bronchospasm: Individuals with underlying asthma may suffer bronchospasm. Treat as any asthmatic: Inhaled albuterol, parenteral steroids, theophylline. Watch for hypoxia.

Adult

Inhaled albuterol: unit dose q 2 hr.

Steroids: methylprednisolone, load 120 mg, then 60 mg q 6 hr.

Theophylline: load 150 mg, then 30 mg/hr.

Infants and Children (0-12 yr)

Inhaled albuterol: 0.15 mg/kg per nebulized dose, up to 5 mg/20 minutes for first 2 hr.

Steroids: methylprednisolone: 1 mg/kg q 6 hr.

Theophylline: 10 mg/kg/24 hr.

Elderly

Inhaled albuterol: unit dose q 3 hr.

Steroids: methylprednisolone, load 125 mg, then 60 mg q 6 hr.

Theophylline (occasional use): load 100 mg, then 25 mg/hr.

If asymptomatic: Maintain direct observation for at least 6 hours.

If becomes symptomatic, treat as above.

If still asymptomatic, lesser observation for additional 36 hours.

If hypotensive (will occur rapidly with pulmonary edema): Immediate volume replacement should be undertaken. Colloid or crystalloid may be used to maintain adequate tissue perfusion.

ATROPINE
Dosage Chart at 0.1 mg/mL Drug Concentration
(0.02 mg/kg Pediatric, 2 mg Adult)

Estimated Age	**Estimated Weight**	**Dose in mL**
3 months	5 kg (11 lb)	1 mL
12 months	10 kg (22 lb)	2 mL
3 years	15 kg (33 lb)	3 mL
6 years	20 kg (44 lb)	4 mL
8 years	25 kg (55 lb)	5 mL
10 years	30 kg (66 lb)	6 mL
11 years	35 kg (77 lb)	7 mL
12 years	40 kg (88 lb)	8 mL
13 years	45 kg (99 lb)	9 mL
14 years or more	50 kg (110 lb) or more	20 mL
Adult	50 kg (110 lb) or more	20 mL

ATROPINE
Dosage Chart at 0.4 mg/mL Drug Concentration
(0.02 mg/kg Pediatric, 2 mg Adult)

Estimated Age	**Estimated Weight**	**Dose in mL**
3 months	5 kg (11 lb)	0.25 mL
12 months	10 kg (22 lb)	0.5 mL
3 years	15 kg (33 lb)	0.75 mL
6 years	20 kg (44 lb)	1 mL
8 years	25 kg (55 lb)	1.25 mL
10 years	30 kg (66 lb)	1.5 mL
11 years	35 kg (77 lb)	1.75 mL
12 years	40 kg (88 lb)	2 mL
13 years	45 kg (99 lb)	2.25 mL
14 years or more	50 kg (110 lb) or more	5 mL
Adult	50 kg (110 lb) or more	5 mL

ATROPINE
Dosage Chart at 1 mg/mL Drug Concentration
(0.02 mg/kg Pediatric, 2 mg Adult)

Estimated Age	**Estimated Weight**	**Dose in mL**
3 months	5 kg (11 lb)	0.1 mL
12 months	10 kg (22 lb)	0.2 mL
3 years	15 kg (33 lb)	0.3 mL
6 years	20 kg (44 lb)	0.4 mL
8 years	25 kg (55 lb)	0.5 mL
10 years	30 kg (66 lb)	0.6 mL
11 years	35 kg (77 lb)	0.7 mL
12 years	40 kg (88 lb)	0.8 mL
13 years	45 kg (99 lb)	0.9 mL
14 years or more	50 kg (110 lb) or more	2 mL
Adult	50 kg (110 lb) or more	2 mL

ATROPINE
Dosage Chart at 2 mg/mL Drug Concentration
(0.02 mg/kg Pediatric, 2 mg Adult)

Estimated Age	**Estimated Weight**	**Dose in mL**
3 months	5 kg (11 lb)	0.05 mL
12 months	10 kg (22 lb)	0.1 mL
3 years	15 kg (33 lb)	0.15 mL
6 years	20 kg (44 lb)	0.2 mL
8 years	25 kg (55 lb)	0.25 mL
10 years	30 kg (66 lb)	0.3 mL
11 years	35 kg (77 lb)	0.35 mL
12 years	40 kg (88 lb)	0.4 mL
13 years	45 kg (99 lb)	0.45 mL
14 years or more	50 kg (110 lb) or more	1 mL
Adult	50 kg (110 lb) or more	1 mL

PRALIDOXIME
(2-PAM, Protopam® Dosage Chart at 50 mg/mL
(For IV Use) – (50 mg/kg Pediatric, 1,000 mg Adult)

Estimated Age	**Estimated Weight**	**Dose in ML**
3 months	5 kg (11 lb)	5 mL = 250 mg
12 months	10 kg (22 lb)	10 mL = 500 mg
3 years	15 kg (33 lb)	15 mL = 750 mg
6 years	20 kg (44 lb)	20 mL = 1,000 mg
8 years	25 kg (55 lb)	20 mL
10 years	30 kg (66 lb)	20 mL
11 years	35 kg (77 lb)	20 mL
12 years	40 kg (88 lb)	20 mL
13 years	45 kg (99 lb)	20 mL
14 years or more	50 kg (110 lb) or more	20 mL
Adult	50 kg (110 lb) or more	20 mL

PRALIDOXIME
(2-PAM, Protopam® Dosage Chart at 300 mg/mL
(For IM Use) – (40 mg/kg Pediatric, 600 mg Adult)

Estimated Age	**Estimated Weight**	**Dose in mL**
3 months	5 kg (11 lb)	0.7 mL
12 months	10 kg (22 lb)	1.3 mL
3 years or more	15 kg (33 lb) or more	2 mL
Adult	50 kg (110 lb) or more	20 mL

AMYL NITRITE
Dosage Instructions

For all ages, crush ampule and allow it to be inhaled for up to 3 minutes. If patient is endotracheally intubated, place armpule or some of its contents in the large end of the ET tube where it connects to the Ambu bag or the ventilator.

If amyl nitrite use is to continue beyond 3 minutes, use a new vial approximately every 3 minutes until patient recovers or until sodium nitrite can be administered.

Once venous access is established and sodium nitrite is available, administer sodium nitrite and discontinue use of amyl nitrite as soon as possible.

SODIUM NITRITE
Dosage Chart at 3% (300 mg/10 mL)
(Pediatric 0.3 mL/kg for Hgb 11 g/dL, Adult 10 mL)

Estimated Age	**Estimated Weight**	**Dose in mL**
3 months	5 kg (11 lb)	1.5 mL
12 months	10 kg (22 lb)	3 mL
3 years	15 kg (33 lb)	4.5 mL
6 years	20 kg (44 lb)	6 mL
8 years	25 kg (55 lb)	7.5 mL
10 years	30 kg (66 lb)	9 mL
11 years	35 kg (77 lb)	10 mL
12 years	40 kg (88 lb)	10 mL
13 years	45 kg (99 lb)	10 mL
14 years or more	50 kg (110 lb) or more	10 mL
Adult	50 kg (110 lb) or more	10 mL

SODIUM THIOSULFATE
Dosage Chart at 25% Concentration
(Pediatric 1.65 mL/kg, Adult 50 mL)

Estimated Age	**Estimated Weight**	**Dose in mL**
3 months	5 kg (11 lb)	8 mL
12 months	10 kg (22 lb)	17 mL
3 years	15 kg (33 lb)	25 mL
6 years	20 kg (44 lb)	33 mL
8 years	25 kg (55 lb)	41 mL
10 years	30 kg (66 lb)	50 mL
11 years	35 kg (77 lb)	50 mL
12 years	40 kg (88 lb)	50 mL
13 years	45 kg (99 lb)	50 mL
14 years or more	50 kg (110 lb) or more	50 mL

THIS PAGE IS INTENTIONALLY LEFT BLANK

FACTSHEET

Anthrax

Description of Agent: Inhalation anthrax is a highly lethal infection caused by inhalation of aerosols of the spore form of the bacteria *Bacillus anthracis*. In naturally occurring cases, spread may be by entry through skin wounds, causing a localized infection.

Signs and Symptoms: Incubation period for inhalation anthrax is 1 to 6 days. Fever, malaise, fatigue, cough, and mild chest discomfort are followed by severe respiratory distress with dyspnea, diaphoresis, stridor, and cyanosis. Shock and death occur within 24 to 36 hours of severe symptoms.

In cutaneous anthrax, a papule develops, then vesicles, followed by a black eschar surrounded by moderate to severe edema. The lesions are usually not painful. Without treatment, the disease may progress to septicemia and death, with a case-fatality rate of 20 Percent. With treatment, fatalities are rare.

Diagnosis: Physical findings are nonspecific in inhalation cases with initial complaints of malaise, fever, headache, and possibly some substernal chest pain. A widened mediastinum is often seen on x-ray. Detectable by Gram stain of the blood and by blood culture late in the course of illness.

Treatment: Although usually not effective for inhalation cases after symptoms are present, high-dose antibiotic treatment with penicillin, ciprofloxacin, or doxycycline should be undertaken. Without antibiotic sensitivities, treatment should be started with IV ciprofloxacin (400 mg q 8 to 12 hr) or IV doxycycline (200 mg initially, followed by 100 mg q 12 hr). Supportive therapy may be necessary.

Prophylaxis: A licensed vaccine for use in those considered to be at risk of exposure. Vaccine schedule is 0, 2, and 4 weeks for the initial series, followed by boosts at 6, 12, and 18 months and then a yearly booster. Oral ciprofloxacin (500 mg po b.i.d.) or doxycycline (100 mg po b.i.d.) for known or imminent exposure. After confirmed exposure, all unimmunized individuals should have two 0.5-mil doses of the vaccine 2 weeks apart, and those vaccinated with less than 3 doses prior to exposure should have a single 0.5-mil booster. Anyone vaccinated with the initial 3-dose series in the previous 6 months does not need any boosters. Everyone exposed should continue antibiotics for 4 weeks. If no vaccine is available, antibiotics should be used beyond 4 weeks and withdrawn under medical supervision.

Decontamination: Secretion and lesion precautions should be practiced. Anthrax has not been transmitted by the aerosol route person to person. After an invasive procedure or autopsy is performed, the instruments and area used should be thoroughly disinfected with a sporicidal agent (iodine or 0.5 percent sodium hypochlorite).

TREATMENT PROTOCOL
Anthrax

1. General

Anthrax is a highly lethal infection spread by inhalation or entry through skins wounds. The inhalation form progresses over rapidly and is more dangerous than the skin form. Incubation period is 1 to 6 days. Fever, malaise, fatigue, cough, and mild chest discomfort are followed by severe respiratory distress with dyspnea, diaphoresis, stridor, and cyanosis. Shock and death occur within 24 to 36 hours of severe symptoms.

2. Treatment

a. Evaluate patient for fever, cyanosis, and respiratory distress.

b. Patient should be given oxygen during transport, as needed.

c. All patients should receive cardiac monitoring and evaluation of oxygenation saturation via pulse oximeter.

d. Obtain IV access with lactated Ringers at KVO rate.

e. Although usually not effective after severe symptoms are present, high-dose antibiotic treatment with penicillin, ciprofloxacin, or doxycycline should be undertaken. Without antibiotic sensitivities, treatment should be started with IV ciprofloxacin (400 mg q 8 to 12 hr) or IV doxycycline (200 mg initially, followed by 100 mg q 12 hr). Supportive therapy may be necessary.

f. Before transporting, check for additional victims.

g. Transport patient to medical facility as directed by dispatcher.

h. Secretion and lesion precautions should be practiced. Anthrax has not been transmitted by the aerosol route person to person. After an invasive procedure or autopsy is performed, the instruments and area used should be thoroughly disinfected with a sporicidal agent (iodine or chlorine). Wiping the ambulance interior with a 70-percent alcohol or other disinfectant is probably unnecessary, but would not be unreasonable; that need not be completed before the next run.

i. Public health officials may recommend that others who may have been initially exposed take prophylactic antibiotics and immunizations before they show signs of illness. If a registry is established, all emergency personnel should identify themselves and indicate when, where, and to what extent they might have been exposed.

FACTSHEET

Botulinum Toxins

Description of Agent: Botulinum toxins are poisonous substances produced by a bacterium *Clostridium botulinum*. They are usually formed in canned foods and eaten but can be spread by aerosol and inhalation. The toxin blocks acetylcholine release at the neuromuscular junction and in the central and peripheral nervous systems.

Signs and Symptoms: Ptosis, generalized weakness, dizziness, dry mouth and throat, blurred vision and diplopia, dysarthria, dysphonia, and dysphagia followed by symmetrical descending flaccid paralysis and development of respiratory failure. Symptoms begin as early as 24 to 36 hours but may take several days after inhalation of toxin.

Diagnosis: Clinical diagnosis. No routine laboratory findings. Biowarfare or terrorist attack should be suspected if numerous collocated casualties have progressive descending bulbar, muscular, and respiratory weakness.

Treatment: Intubation and ventilatory assistance for respiratory failure. Tracheostomy may be required. Administration of botulinum antitoxin as soon as possible—trivalent licensed product made by the Centers for Disease Control and Prevention (CDC) or heptavalent investigational new drug (IND) product—may prevent or decrease progression to respiratory failure and hasten recovery. Skin testing must be performed before administration of the antitoxin.

Prophylaxis: Pentavalent toxoid (types A, B, C, D, and E) is available as an IND product for those at high risk of exposure. The dosage schedule is 0, 2, and 12 weeks, with yearly boosters.

Decontamination: Hypochlorite and/or soap and water. Toxin is not dermally active and secondary aerosols are not a hazard from patients.

TREATMENT PROTOCOL
Botulinum Toxin

1. General

Botulinum toxin is a poisonous substance produced by a bacterium, *Clostridium botulinum*. It is usually formed in canned food and eaten but can be spread by aerosol and inhalation. Onset of symptoms is hours to days after taking the poison into the body, so there is virtually no chance that emergency responders would be endangered by the poison carried by a victim. Symptoms typically include drooping eyelids, blurred or double vision, trouble swallowing, dry mouth, and sore throat (followed by a flaccid limp) and paralysis that begins near the head and moves downward. Death most often results from respiratory failure, so respiratory support is the most important aspect of pre-hospital care. Symptoms begin as early as 24 to 36 hours but may take several days after inhalation of toxin.

2. Treatment

a. Evaluate patient for paralysis, cyanosis, respiratory distress, and signs of pneumonia superimposed on paralysis.

b. Patient may require artificial respiration during transport.

c. All patients should receive cardiac monitoring and evaluation of oxygenation saturation via pulse oximeter.

d. Patient should be given oxygen during transport, as needed, but mechanical ventilation may be more important than oxygen.

e. IV access is not critical, but will be helpful in the hospital setting where a specific antitoxin will be administered and where the patient will probably remain for a few days to several weeks. If desired, obtain IV access with lactated Ringers at KVO rate.

f. Intubation and ventilatory assistance may be necessary for respiratory failure. Tracheostomy may be required. Administration of botulinum antitoxin—trivalent licensed product made by CDC or heptavalent IND product—may prevent or decrease progression to respiratory failure and hasten recovery. Skin testing must be performed before administration of the antitoxin.

g. Before transporting, check for additional victims.

h. Transport patient to medical facility as directed by dispatcher.

i. Decontaminate with hypochlorite and/or soap and water. Toxin is not dermally active and secondary aerosols are not a hazard from patients.

FACTSHEET

Cholera

Description of Agent: Cholera is a bacterial infection causing severe diarrhea and fluid loss. The causal organism, *Vibrio cholerae*, is spread through water or food. IV fluids may be exhausted in a hospital or an isolated community during an epidemic.

Signs and Symptoms: Incubation period is 1 to 5 days. Asymptomatic to severe with sudden onset. Vomiting, abdominal distention, and pain with little or no fever followed rapidly by a profuse watery diarrhea with a "rice-water" appearance. Fluid losses may exceed 5 to 10 liters per day. Without treatment, death may result from severe dehydration, hypovolemia, and shock.

Diagnosis: Clinical diagnosis. Watery diarrhea and dehydration. Microscopic exam of stool samples reveals few or no red or white cells. Can be identified in stool by darkfield or phase contrast microscopy, and can be grown on a variety of culture media.

Treatment: Fluid and electrolyte replacement. Often can be accomplished by the use of oral rehydration salts or dilute Gatorade™, with the need for IV fluids with severe dehydration. Antibiotics will shorten the duration of diarrhea and thereby decrease fluid loss—tetracycline (50 mg q 6 hr x 3 days) or doxycycline (30 mg once or 100 mg q 12 hr x 3 days). There is widespread tetracycline resistance and ciprofloxacin (500 mg q 12 hr x 3 days), or erythromycin (500 mg q 6 hr x 3 days) should also be considered.

Prophylaxis: A licensed, killed vaccine is available but provides only about 50 percent protection that lasts for no more than 6 months. Vaccination schedule is at 0 and 4 weeks, with booster doses every 6 months.

Decontamination: Personal contact rarely causes infection; however, enteric precautions and careful handwashing should be employed. Gloves should be used for patient contact and specimen handling. Bacteriocidal solutions (hypochlorite) would provide adequate decontamination.

TREATMENT PROTOCOL
Cholera

1. General

Cholera is a bacterial infection causing severe diarrhea and fluid loss. The causal organism, *Vibrio cholerae*, is spread through water or food. When growing in the intestines, the organism releases a toxin. The toxin, not the infection itself, is the cause of diarrhea. Fluid loss through watery diarrhea is profound and may exceed 5 to 10 liters per day. IV fluids may be exhausted in a hospital or an isolated community during an epidemic. Without treatment, death may result from severe dehydration, hypovolemia, and shock.

2. Treatment

a. Evaluate patient for rehydration and shock.

b. Obtain IV access with a large-bore needle and run lactated Ringers at a rate sufficient to correct volume loss and replace fluids.

c. Telemetered electrocardiogram (EKG) may provide information on electrolyte balance.

d. Protect yourself and others from contact with diarrheal fluids; they are highly infectious.

(1) Don gloves and aprons or other protective garments.

(2) Try to contain stools, to minimize contamination of the ambulance. Blanket rolls may be used to create a dike, and plastic or other sheeting may be used to contain fluid within the dike.

(3) Change contaminated clothing and wash hands thoroughly.

e. Before transporting, check for additional victims.

f. Transport patient to medical facility as directed by dispatcher.

g. Fluid and electrolyte replacement should be undertaken and often can be accomplished by the use of oral rehydration salts or diluted Gatorade™. IV fluids are needed with severe dehydration. Antibiotics will shorten the duration of diarrhea and thereby decrease fluid loss—tetracycline (500 mg q 6 hr x 3 days) or doxycycline (300 mg once or 100 mg q 12 hr x 3 days). There is widespread tetracycline resistance and ciprofloxacin (500 mg q 12 hr x 3 days), or erythromycin (500 mg q 6 hr x 3 days) should also be considered.

h. Personal contact rarely causes infection; however, enteric precautions and careful handwashing should be employed. Bacteriocidal solutions (hypochlorite) would provide adequate decontamination. Wash the ambulance interior, if necessary, and wipe with a 70-percent alcohol, dilute chlorine bleach, or other disinfectant. If practical, complete the decontamination before the next run.

THIS PAGE IS INTENTIONALLY LEFT BLANK

FACTSHEET

Plague

Description of Agent: Plague is an infectious disease caused by the bacteria *Yersinia pestis*. In nature, plague is most often spread by fleas that feed on infected rodents, and then incidentally bite humans. When spread by that route, it classically causes a local abscess with formation of very large, abscessed, regional lymph nodes called buboes. Plague can also spread by aerosol and inhalation of sputum droplets from a coughing patient. In that manner, a primary pneumonic form develops and progresses rapidly to death without treatment. Person-to-person spread from a pneumonic plague patient can occur.

Signs and Symptoms: Pneumonic plague incubation period is 2 to 3 days. High fever, chills, headache, hemoptysis, and toxemia progress rapidly to dyspnea, stridor, and cyanosis. Death results from respiratory failure, circulatory collapse, and a bleeding diathesis. Bubonic plague incubation period is 2 to 10 days. Malaise, high fever, and tender lymph nodes (buboes); may progress spontaneously to the septicemic form, with spread to the CNS, lungs, and elsewhere.

Diagnosis: Clinical diagnosis. A presumptive diagnosis can be made by Gram or Wayson strain of lymph node aspirates, sputum, or CSF. Plague can also be cultured.

Treatment: Early administration of antibiotics is very effective, but must be started within 24 hours of onset of symptoms in pneumonic plague. Treatment of choice is streptomycin 30 mg/kg/day IM in two divided doses x 10 days. Intravenous doxycycline 200 mg, then 100 mg q 12 hr x 10 to 14 days is also effective. Chloramphenicol is necessary for plague meningitis. Supportive therapy for pneumonic and septicemic forms is required.

Prophylaxis: A licensed, killed vaccine is available. Initial dose followed by a second smaller dose 1 to 3 months later, and a third 3 to 6 months later. A booster dose is given at 6, 12, and 18 months, and then every 1 to 2 years. This vaccine does not protect against aerosol exposure. After face-to-face contact with a pneumonic plague patient or after a confirmed or suspected attack with aerosolized plague, doxycycline 100 mg po b.i.d. x 7 days or for the duration of exposure, whichever is longer, should be used.

Decontamination and Isolation: Secretion and lesion precautions with bubonic plague. Strict isolation of patients with pneumonic plague. Respiratory isolation with the use of a filtered respirator for those with direct contact with patients, and secretion precautions are necessary until the patient has been on antibiotics for at least 48 hours and there has been a favorable response to treatment. Heat, disinfectants, and exposure to sunlight render the bacteria harmless.

TREATMENT PROTOCOL
Plague

1. General

Plague is an infectious disease caused by a bacterium called *Yersinia pestis* (formerly *Pasteurella pestis*). In nature, plague is most often spread by fleas that feed on infected rodents, then incidentally bite humans. When spread by that route, it classically causes a local abscess with formation of very large, abscessed, regional lymph nodes called buboes (hence the term "bubonic plague"). Incubation period is 2 to 10 days. Symptoms of malaise, high fever, and tender lymph nodes may progress spontaneously to the septicemic form and spread to the CNS, lungs, and elsewhere. Plague can also spread by aerosol and inhalation of sputum droplets from a coughing patient. In that manner, a primary pneumonic form develops and progresses rapidly to death. Person-to-person spread from a pneumonic plague victim can occur; protective measures are needed to protect against plague as well as other, more common, diseases.

Pneumonic plague incubation period is 2 to 3 days. Symptoms of high fever, chills, headache, hemoptysis, and toxemia may progress rapidly to dyspnea, stridor, and cyanosis. Death results from respiratory failure, circulatory collapse, and a bleeding diathesis.

2. Treatment

a. Wear a well-fitting mask with a high-efficiency particulate (HEPA) filter, following the guidelines for control of tuberculosis.

b. If breathing allows, the patient should be masked to stop as many of the cough droplets as possible before they evaporate to form small-diameter droplet nuclei, which are harder to filter out.

c. Evaluate patient for fever, cyanosis, and respiratory distress.

d. The patient should be given oxygen during transport, as needed.

e. All patients should receive cardiac monitoring and evaluation of oxygenation saturation via pulse oximeter.

f. Obtain IV access with lactated Ringers at KVO rate.

g. Early administration of antibiotics is very effective, but must be started within 24 hours of onset of symptoms in pneumonic plague. Treatment of choice is streptomycin 3-mg/kg/day IM in 2 divided doses 10 days. Intravenous doxycycline 200 mg, then 100 mg q 12 hr x 10 to 14 days is also effective. Chloramphenicol is necessary for plague meningitis. Supportive therapy for pneumonic and septicemic forms is required.

h. Before transporting, check for additional victims.

i. Transport patient to medical facility as directed by dispatcher.

j. Secretion and lesion precautions should be observed with bubonic plague. Strict isolation of patients with pneumonic plague is needed. Respiratory isolation and secretion precautions are necessary until the patient has been on antibiotics for at least 48 hours and there has been a favorable response to treatment. Heat, disinfectants, and exposure to sunlight renders bacteria harmless.

k. Wiping the ambulance interior with a 70-percent alcohol or other disinfectant must be done if there is gross contamination with secretions or pus; this is a reasonable precaution in all cases. The organisms do not survive well outside a host; therefore, in an emergency with heavy demand on transport resources, decontamination need not be done before the next run unless there is gross contamination.

l. Public health officials usually recommend that others who may have been exposed take prophylactic antibiotics before they show signs of illness. If a registry is established, all emergency personnel should identify themselves and indicate when, where, and to what extent they might have been exposed. Quarantine may be imposed on those who cannot take or who refuse to take prophylactic treatment.

THIS PAGE IS INTENTIONALLY LEFT BLANK

FACTSHEET

Q Fever

Description of Agent: Q fever is an infectious disease caused by a rickettsial organism, *Coxiella burnetti*. It is usually spread by aerosolized organisms from infected animal products, such as the placenta, but could be made into an aerosol and disseminated as a terrorist weapon. Person-to-person transmission rarely, if ever, occurs. Case fatality rates are usually below 1 percent.

Signs and Symptoms: Fever, chills, sweats, cough, headache, weakness, and pleuritic chest pain may occur as early as 10 days after exposure. Onset may be sudden or insidious and present as a "fever of unknown origin." Pneumonia is present in some cases, but pulmonary syndromes are usually not prominent. Patients are not generally critically ill, and the illness lasts from 2 days to 2 weeks.

Diagnosis: Q fever is not a clinically distinct illness and may resemble a viral illness or other types of atypical pneumonia. The diagnosis is confirmed serologically.

Treatment: Q fever is generally a self-limited illness even without treatment. Tetracycline (500 mg q 6 hr) of doxycycline (100 mg q 12 hr) are the treatments of choice and are given orally for 5 to 7 days. Q fever endocarditis (rare) is much more difficult to treat.

Prophylaxis: Treatment with tetracycline or doxycycline, starting between the 8th to 12th day postexposure and continued for 5 days, should prevent the onset of symptoms. An inactivated whole cell vaccine (investigational) is effective in eliciting protection against exposure, but severe local reactions to this vaccine may be seen in those who already possess immunity.

Decontamination: Patients who are exposed to Q fever by aerosol do not present a risk for secondary contamination or re-aerosolization of the organism. Decontamination is accomplished with soap and water or by the use of weak (0.5 percent) hypochlorite solutions.

TREATMENT PROTOCOL
Q Fever

1. General

Q fever is an infectious disease caused by a rickettsial organism. Rickettsia are smaller than bacteria but larger than viruses. They usually live within cells, but have more complete metabolic systems than viruses. The organism that causes Q fever is called *Coxiella burnetti*. The organism is robust, and infection occurs via inhalation of organisms. After an incubation period, which may require from 10 days to 3 weeks, onset may be sudden with chills, a headache behind the eyes, weakness, malaise, and severe sweats, or onset may be insidious and present as a "fever of unknown origin." Pneumonia is present in some cases, but pulmonary symptoms are usually not prominent. Person-to-person transmission rarely, if ever, occurs. Case fatality rates are usually below 1 percent.

2. Treatment

a. Evaluate patient for dehydration and shock (which would suggest an alternate diagnosis). If effects are mild, it might be practical to send the patient for medical care via private conveyance; hospitalization may not be necessary.

b. IV fluids are not usually necessary, but if the patient's condition suggests dehydration or the possibility of some other diagnosis, obtain IV access and run lactated Ringers at a rate sufficient to correct volume loss and replace fluids.

c. Universal precautions should be practiced with respect to body fluids.

d. Q fever is generally a self-limited illness even without treatment. Tetracycline (500 mg q 6 hr) and doxycycline (100 mg q 12 hr) are the treatments of choice and are given orally for 5 to 7 days starting between the 8th to 12th day postexposure. Q fever endocarditis (rare) is much more difficult to treat.

e. Before transporting, check for additional victims.

f. Transport patient to medical facility as directed by dispatcher.

g. Patients who are exposed to Q fever by aerosol do not present a risk for secondary contamination or re-aerosolization of the organism. Decontamination is accomplished with soap and water or by the use of weak (0.5 percent) hypochlorite solutions. Wash the ambulance interior if necessary and wipe with dilute (0.5 percent) chlorine bleach or other appropriate disinfectant. Decontamination is not absolutely necessary before the next run unless there has been unusually heavy contamination.

FACTSHEET

Salmonella

Description of Agent: Several distinct bacteria within the group *Salmonella* cause diarrheal illnesses, sometimes with a septicemia. *Salmonella typhimurium*, which causes a typhoid fever-like illness in mice and rats but usually only a diarrheal illness in humans, in 1984 was used by terrorists in Oregon to contaminate foods in restaurants (720 people became ill as a result). *Salmonella* illnesses are not rare and cannot be distinguished on the basis of clinical signs from other causes of diarrhea. The illness would typically be less profound than with cholera. Infants are at greatest risk of severe illness and death.

Signs and Symptoms: Acute onset of headache, abdominal pain, bloody diarrhea, nausea, and sometimes vomiting 6 to 72 hours after exposure to contaminated food; incubation is usually 12 to 36 hours. Fever is usually present. Diarrhea and anorexia often last several days. Dehydration may be severe, especially in infants.

Diagnosis: Fecal Gram stain and culture; serologic tests are not useful. Salmonella is a commonly occurring disease in the United States with an estimated 5 million annual cases.

Treatment: For uncomplicated cases, oral rehydration therapy alone is indicated. IV fluids may be needed with severe dehydration. Antibiotics may prolong the carrier state, but should be considered with infants, the elderly, or those with underlying illnesses. Ciprofloxacin 500 mg q 12 hr x 3 days is effective.

Prophylaxis: No immunization available.

Decontamination: Enteric precautions should be practiced. Hypochlorite and/or soap and water is effective. Destroy any remaining contaminated food. Wear gloves for patient contact and specimen handling.

TREATMENT PROTOCOL
Salmonella

1. General

Several distinct bacteria within the group *Salmonella* cause diarrheal illnesses, sometimes with a septicemia (where organisms are also multiplying in the blood and other tissue). *Salmonella typhimurium*, which causes a typhoid fever-like illness in mice and rats but usually on a diarrheal illness in humans, in 1984 was used by terrorists in Oregon to contaminate foods in restaurants (720 people became ill as a result). Salmonella illnesses are not rare and cannot be distinguished on the basis of clinical signs from other causes of diarrhea. The illness would typically be less profound than that with cholera. Infants are at greatest risk of severe illness and death. Signs and symptoms include acute onset of headache, abdominal pain, bloody diarrhea, nausea, and sometimes vomiting 6 to 72 hours after exposure to contaminated food; incubation is usually 12 to 36 hours. Fever is usually present. Diarrhea and anorexia often last several days. Dehydration may be severe, especially in infants.

2. Treatment

a. Evaluate patient for dehydration and shock. If the patient has only mild effects, it might be practical to send them for medical care via private conveyance; hospitalization may not be necessary.

b. Obtain IV access with a large-bore needle and run lactated Ringers at a rate sufficient to correct volume loss and replace fluids.

c. Telemetered EKG may provide information on electrolyte balance.

d. Protect yourself and others from contact with diarrheal fluids; they are highly infectious.

(1) Don gloves and aprons or other protective garments.

(2) Try to contain stools, to minimize contamination of the ambulance. Blanket rolls may be used to create a dike, and plastic or other sheeting may be used to contain fluid within the dike.

(3) Change contaminated clothing and wash hands thoroughly.

e. For uncomplicated cases, oral rehydration therapy alone is indicated. IV fluids may be needed with severe dehydration. Antibiotics may prolong the carrier state, but should be considered with infants, the elderly, or those with underlying illnesses. Ciprofloxacin 500 mg q 12 hr x 3 days is effective.

f. Before transporting, check for additional victims.

g. Transport patient to medical facility as directed by dispatcher.

h. Enteric precautions should be practiced. Hypochlorite and/or soap and water is effective. Destroy any remaining contaminated food. Wash the ambulance interior, if necessary, and wipe with a 70-percent alcohol, dilute chlorine bleach, or other disinfectant. If practical, complete the decontamination before the next run.

THIS PAGE IS INTENTIONALLY LEFT BLANK

FACTSHEET

Staphylococcal Enterotoxin B

Description of Agent: Staphylococcus enterotoxin B (SEB) is one of several toxins produced by the bacteria *Staphylococcus aureus*. SEB is a common contributor to staphylococcal food poisoning but can also be disseminated as an aerosol and inhaled.

Signs and Symptoms: From 3 to 12 hours after aerosol exposure, sudden onset of fever, chills, headache, myalgia, and nonproductive cough. Some patients may develop shortness of breath and retrosternal chest pain. Fever may last 2 to 5 days, and cough may persist for up to 4 weeks. Patients may also present with nausea, vomiting, and diarrhea if they swallow toxin. Higher exposure levels can lead to pulmonary edema, and rarely, death.

Diagnosis: Diagnosis is clinical. Patients present themselves with a febrile respiratory syndrome without CXR abnormalities. Large numbers of people presenting themselves with typical symptoms and signs of SEB pulmonary exposure would suggest an intentional attack with this toxin.

Treatment: Treatment is limited to supportive care. Artificial ventilation might be needed for very severe cases, and attention to fluid management is important.

Prophylaxis: Use of protective mask. There is currently no human vaccine available to prevent SEB intoxication.

Decontamination: Hypochlorite (bleach) and/or soap and water. Destroy any food that may have been contaminated.

TREATMENT PROTOCOL
Staphylococcal Enterotoxin B

1. General

Staphylococcus enterotoxin B (SEB) is a substance produced by *Staphylococcus aureus*. SEB is a common contributor to food borne enteritis outbreaks but can also be disseminated as an aerosol and inhaled. Symptoms usually follow inhalation by 3 to 12 hours and would include sudden onset of fever, headache, chills, pain in the muscles, and a nonproductive cough. Nausea, vomiting, and watery diarrhea may be accompanied by heavy fluid losses and a feeling of profound malaise leading to incapacitation; higher doses can lead to a toxic shock syndrome and death. Reddening of the eyes is common. Overall, the mortality rate from an attack would be lower than that from many other biological agents.

2. Treatment

a. Evaluate patient for dehydration and shock.

b. Obtain IV access with a large-bore needle and run lactated Ringers at a rate sufficient to correct volume loss and replace fluids.

c. Telemetered EKG may provide information on electrolyte balance.

d. Diarrheal fluids are not dangerous, but you may not know whether you are dealing with SEB, cholera, or Salmonellosis. Therefore, treat diarrheal fluid as highly infectious.

(1) Don gloves and aprons or other protective garments.

(2) Try to contain stools, to minimize contamination of the ambulance. Blanket rolls may be used to create a dike, and plastic or other sheeting may be used to contain fluid within the dike.

(3) Change contaminated clothing and wash hands thoroughly.

e. Treatment is limited to supportive care. Artificial ventilation might be needed for very severe cases, and attention to fluid management is important.

f. Before transporting, check for additional victims.

g. Transport patient to medical facility as directed by dispatcher.

h. Decontaminate with hypochlorite (bleach) and/or soap and water. Destroy any food that may have been contaminated. Wash the ambulance interior, if necessary, and wipe with a 70-percent alcohol, dilute chlorine bleach, or other disinfectant. If practical, complete the decontamination before the next run.

ANNEX C

PHARMACEUTICAL PRODUCT LIST FOR WEAPONS OF MASS DESTRUCTION (WMD) RESPONSE FOR 1,000 PATIENTS

PRODUCT	PRODUCT CODE	TOTAL INVENTORY	UNIT ORDER SIZE (Package Size)	TOTAL UNITS TO ORDER	ANTICIPATED PRODUCT USE (On–Scene or Hospital Resupply)
ANALGESICS					
Ketoralac (Toradol) Injection 30mg/mL; 1mL	6505-01-357-5375	50	10	5	OH
CONTROLLED ANALGESICS					
Butorphanol Injection 2mg/mL	6505-00-000-2978	50	10	5	OH
Morphine Sulphate Injection 10mg/mL	6505-00-149-0113	50	10	5	OH
ANESTHETICS					
Ketamine HCl Injection 10mg/mL; 20mL Vial	NA	50	10	5	OH
Lidocaine 1% Injection; 20mL Vial	6505-00-000-2819	50	25	2	OH
Lidocaine 4% Viscous; 50mL	6505-00-772-0157	50	1	50	OH
ANTICONVULSANTS					
Phenytoin Injection 50mg/mL; 5mL	6505-00-139-4348	50	10	5	OH
Phenobarbital Injection 130mg/mL	6505-00-812-2556	50	10	5	OH
TOPICAL ANTI-INFECTIVES					
Polysporin Ointment; 3gm Unit of Use Packets	NA	288	144	2	OH
Silver Sulfadiazine (Silvadene) Cream 1%; 85gm	NA	100	1	100	OH
CARDIOVASCULAR PRODUCTS					
Atenolol 5mcg/ml Injection	NA	50	1	50	OH
Calcium Chloride Injection 10% 10mL	6505-00-009-4968	50	10	5	OH
Digoxin Injection 0.25mg/mL; 2mL amps	6505-00-531-7761	50	10	5	OH
Dopamine 250mg/600ml Injection	NA	50	10	5	OH
Epinephrine 1:10,000 (0.1mg/mL); 10mL	6505-01-149-8559	50	25	2	OH
Heparin 25,000/250ml D5W	NA	12	12	1	OH
Lidocaine 1% Injection; 2mL Prefilled Syringes (PFS)	6505-01-105-4179	50	10	5	OH
Magnesium Sulfate Injection; 1gm	NA	50	10	5	OH
Nitroglycerin Injection 5mg/mL; 10mL	NA	15	10	1.5	OH
Nitroglycerin Tablets 1/150gr (bottles)	6505-00-687-3663	200	100	2	OH
Potassium Chloride Injection; 10meg; 5mL	NA	30	10	3	OH
Sodium Bicarbonate Injection 50mEq; 50mL	6505-00-000-2921	30	10	3	OH
Streptokinase 1.5mu Injection	NA	10	1	10	OH
ELECTROLYTES					
Gatorade (Oral Rehydration Electrolyte Powder)	NA	144	12	12	O
PSYCHOTHERAPEUTIC PRODUCT			10	0	
Haloperidol Injection 5mg/mL	6505-00-268-8530	40	10	4	OH
PULMONARY PRODUCTS					
Atrovent Inhalers	6505-01-256-1948	20	1	20	OH

O – On-Scene Use
H – Hospital Resupply
OH – On-Scene or Hospital Resupply

Beclomethasone Inhaler	6505-01-240-0588	20	1	20	OH
EpiPen (or AnaKits)	6505-01-043-6795	40	1	40	OH
SERUMS, TOXOIDS, AND VACCINES					
Gamma Globulin; 5mL	NA	10	0	0	H
CHEMICAL AND NERVE GAS ANTIDOTES					
Atropine/2-PAM Antidote Kit	NA	3000	1	3000	OH
Cana Kit (Diazepam)	NA	1000	1	1000	OH
Lilly Cyanide Antidote Kit	6505-00-000-2966	40	1	40	OH
M291 Skin Decontaminating Kit	NA	1000	5000	0.2	H
Methylprednisolone 80mg/mL; 1mL	6505-00-000-2890	40	10	4	OH
Pralidoxime (2-PAM)		24	1	24	OH
BIOLOGICAL ANTIDOTES					
Amantadine – 200 mg Capsules	6505-00-148-4624	400	100	4	H
Amphotericin B Injection	6505-01-084-9453	10	1	10	H
Bicillin Cartridge Needle Units 1ml 600,000 Units	6505-00-133-4448	50	10	5	H
Ceftazidine 2gm Vial	NA	25	10	2.5	H
Ciprofloxacin 500mg Capsules	6505-01-333-4155	1000	100	10	H
Doxycycline 200mg Capsules	6505-01-153-4335	500	500	1	H
Pentavalent Antitoxin and Toxoid (IND)	NA	0			H
Rifampin 300mg Capsules	6505-00-165-6575	500	100	5	H
Streptomycin 400mg/ml Injection	NA	0	10	0	H
Superactivated Charcoal	NA	5	1	5	H
Trimethoprim (TMP) and Sulfmethoxicol (SMX) 5ml Injection	NA	50	10	5	H
Vibramycin 100mg Capsules	6505-00-369-7296	100	50	2	H
Virazole – 6gms Powder / 100ml Vial (available only der IND status)	NA	4	4	1	H

South Carolina WMD FOG

ADIATION SPECIFIC					
Potassium Iodide, Tablets	6505-01-116-8198	4494	14	321	H
ANCILLARY SUPPLIES					
Ambu Bag, Adult	NA	54	6	9	OH
Ambu Bag, Pediatric	NA	30	6	5	OH
Bandage Scissors 7"	6515-00-363-8840	40	1	40	OH
Biohard Bag	NA	500	250	2	OH
Bite Blocks	6515-01-100-8656	50	10	5	OH
Flashlight w/Batteries	6532-00-781-3671	30	1	30	OH
Gauze 4" x 4"	6510-00-782-2698	600	200	3	OH
Handi-Wipes	NA	2000	100	20	O
Heparin Locks 10units/3ml	NA	200	200	1	O
Intravenous Catheter & Needle Unit, 14G x 2.25"	NA	200	200	1	OH
Intravenous Catheter & Needle Unit, 18G x 2"	NA	150	50	3	OH
Intravenous Catheter & Needle Unit, 22G x 2"	NA	100	50	2	OH
Intravenous Set, Butterfly, 12", 21G, 3/4"	NA	120	120	1	OH
IV Administration Set, 78", w/Clamp, Vented	NA	96	48	2	OH
IV Administration Set, MICRO, w/clamp vented	NA	96	48	2	OH
Kling Gauze, 3"	6510-00-717-5094	20	1	20	OH
Laryngoscope (disposable) large (123mm x 25.7mm blade) #3 MacIntosh	56903	45	1	45	OH
Laryngoscope (disposable) small (77.5mm x 18.2mm blade) #2 MacIntosh	56901	30	1	30	OH
Laryngoscope Light Source (handle for C batteries)	60500	30	1	30	OH
Latex Gloves Sterile (Lg)	6515-01-149-8840	400	50	8	OH
Latex Gloves Sterile (Med)	6515-01-151-1790	400	50	8	OH
Latex Gloves Sterile (Xlg)	6515-01-149-8843	400	50	8	OH
Mask, Surgical, Disposable, with Face Shield (and eye shield)	NA	100	100	1	OH
Nas-Gastric Tube #16	NA	20	1	20	
Nasal Cannulas	6515-01-166-8099	70	1	70	OH
Nasopharmyngeal Airways, 8.0mm ID, 10.5mm OD	NA	10	10	1	OH
Nasopharyngeal Airways, 6.0mm ID, 8.0mm OD	NA	10	10	1	OH
Needle, Disposable, 18G x 1.5"	6515-00-754-2834	200	100	2	OH
Needle, Disposable, 22G x 1"	6515-00-754-2835	200	100	2	OH
Needle, Disposable, 22G x 1.5"	6515-00-059-5782	200	100	2	OH
Needle, Disposable, 25G x 5/8"	6515-00-655-5751	200	100	2	OH
Obstetrical Kit, Emergency	NA	2	1	2	OH
Pressure Infuser (500 mL)	AD-500	12	1	12	O
SAM Splints	NA	24	12	2	OH
Sodium Chloride 0.9%, 500 ml, Plastic Bags	NA	144	24	6	OH
Sphygmomanometer, Set, Child	NA	12	1	12	OH
Sphygmomanometer, Set, Infant	NA	12	1	12	OH

O – On-Scene Use
H – Hospital Resupply
OH – On-Scene or Hospital Resupply

Sylets 10FR	NA	20	20	1	OH
Sylets 16FR	NA	20	20	1	OH
Syringe/Needle, Disposable, 20 g xl.6", 5-6 ml	6515-00-985-7183	200	100	2	OH
Syringe/Needle, Disposable, 3 ml, 21G x 1 1/2"	6515-00-462-7248	200	100	2	OH
Tape 1"	6510-01-060-6369	36	12	3	OH
Tape 2"	6510-01-095-9285	36	6	6	OH
Tape 3"	6510-01-060-6370	36	4	9	OH
Triage Tags	NA	500	50	10	OH
Tube, Endotracheal with cuff, 5.0mm	NA	10	10	1	OH
Tube, Endotracheal with cuff, 6.5mm	NA	10	10	1	OH
Tube, Endotracheal with cuff, 7.5mm	NA	10	10	1	OH
Tube, Endotracheal with cuff, 8.0mm	NA	10	10	1	OH
Tube, Endotracheal without cuff, 2.0mm	NA	10	10	1	OH
Tube, Endotracheal without cuff, 3.0mm	NA	10	10	1	OH
Tube, Endotracheal without cuff, 4.0mm	NA	10	10	1	OH

ANNEX D

PLANNING CONSIDERATIONS FOR EMERGENCY MANAGERS

A. Threat of Terrorism

The threat of terrorism affects all communities both nationally and internationally. History has shown that no community is immune. Terrorism transcends all geographic and demographic boundaries. All jurisdictions—suburban, urban, and rural—are at risk. It is important to note that terrorists have demonstrated a variety of attack methods and unpredictability in target selection. A visibly secure target may cause terrorists to change their focus to an alternate target. New York City suffered an explosive/chemical attack against a large office building (World Trade Center); Tokyo had a chemical attack within their subway; in Oklahoma City, a Government office center was demolished by improvised explosives. Additionally, a civil jurisdiction may become directly threatened as a result of its proximity to a target facility such as an airport. The threat to the public and to public safety agencies responding to incidents involving weapons of mass destruction (WMD) is very real. It is no longer a question of "if it happens," since it already has. The real question is when and where the next incident will occur. A general guideline in considering vulnerability for a terrorist attack involving WMD is to **"never underestimate either the intelligence or the perseverance of the terrorist."**

B. The U.S. Government Policy on Terrorism

It is the policy of the United States to use all appropriate means to deter, defeat, and respond to all terrorist attacks on our territory and resources, both people and facilities, wherever they occur. (Presidential Decision Directive [PDD]-39)

Terrorism is defined as the unlawful use of force or violence committed by a group of individuals against persons or property to intimidate or coerce a government or the civil population in furtherance of political or social objectives. (Federal Bureau of Investigation [FBI])

Weapons of mass destruction (WMD) are defined as any destructive device, explosive, incendiary, or poison gas, bomb, grenade, rocket, missile, or mine involving a disease organism, or any weapon designed to release radiation or radioactivity at a level danger to human life. (Title 18 U.S. Code)

The Defense Against Weapons of Mass Destruction Act of 1996 (Title XIII, Section 1303) further defines WMD. **The term "weapons of mass destruction" means any weapon or device that is intended, or has the capability, to cause death or serious bodily injury to a significant number of people through the release, dissemination, or impact of:**

- Toxic or poisonous chemicals or their precursors.
- Disease organism.
- Radiation or radioactivity.

C. HAZMAT Terrorist WMD Incident Considerations

An NBC terrorist incident is, inherently, a hazardous materials (HAZMAT) incident. **There are, however, significant differences between the two types of incident that influence a civil jurisdiction's response planning, organization, training, equipment, operational procedures, and coordination requirements.** A terrorist WMD incident may be characterized by:

- The use of WMD designed to inflict **mass casualties**.
- The **high lethality** of chemical or biological (C/B) agents.
- The **extremely toxic environment** resulting from NBC WMD.
- The relative ease and inexpensive manner for NBC WMD production.
- The **initial ambiguity in determining what type of NBC weapon or agent is involved**, or, in the case of biological agents, if a terrorist incident has occurred.
- The **potential for a combination of weapons/agents each presenting different response requirements** (i.e., explosives and chemical agents or simultaneous explosives, chemical agents, and radioactive material dispersal).
- The narrow window-of-response time to administer lifesaving antidotes for chemical agents and antibiotics for biological agents.
- The NEED for immediate medical treatment for mass casualties.
- The NEED for immediately available specialized pharmaceuticals.
- The NEED for specialized NBC detection equipment.
- The NEED for a timely, efficient, and effective mass decontamination system.
- The NEED for an organized, trained, and equipped HAZMAT/Emergency Medical Services (EMS) unit to immediately augment the local HAZMAT/EMS response.
- The **NEED** for **precoordination with hospitals and medical treatment centers** to establish medical treatment protocols, stock appropriate pharmaceuticals, and determine treatment procedure requirements.
- The NEED to accomplish advance planning and coordination to respond to each of the NEEDS identified above.

D. WMD Incident Emergency Response Preparedness Review

Local first responders can review the adequacy of the civil jurisdiction's HAZMAT/EMS response capability for a particular NBC terrorist incident. This assessment must consider each of the NEEDS identified above. For example:

- Does the civil jurisdiction have a local or regional HAZMAT/EMS response capability?
- Does the civil jurisdiction have an Emergency Operations Center (EOC) to coordinate HAZMAT/EMS activities and response actions?
- Has the local emergency management office established coordination with appropriate Federal and State HAZMAT/EMS response agencies to establish incident support procedures?
- Is the local HAZMAT/EMS response unit(s) properly equipped to operate safely and efficiently in an NBC terrorist incident environment?
- Is the local HAZMAT/EMS response unit(s) adequately trained and prepared to provide appropriate health and medical services response actions in an NBC terrorist incident environment?
- Does the local HAZMAT/EMS response unit(s) have the capability to provide immediate medical treatment for mass casualties?
- Has advance coordination been established with the appropriate Regional Poison Control Center to properly assist local HAZMAT/EMS and the medical community?
- Has the local HAZMAT/EMS response unit(s) coordinated with local law enforcement agencies to determine requirements for evidence preservation when working at an NBC terrorist incident crime scene?
- Are appropriate pharmaceuticals immediately available in sufficient quantities to treat mass casualties?
- Does the local HAZMAT/EMS emergency response unit(s) have individual team member chemical agent antidotes immediately available?
- Are treatment pharmaceuticals positioned at hospitals and medical treatment facilities in sufficient quantities?
- Have regional caches of treatment pharmaceuticals been established?
- Can regionally stocked treatment pharmaceuticals be quickly transported to local hospitals and medical treatment centers?
- Does the local HAZMAT/EMS response unit(s) have adequate detection capability and equipment to detect and identify NBC materials and agents?

- Does the local HAZMAT/EMS response unit(s) have access to appropriate NBC computer programs for agent identification and medical treatment?

- Does the local HAZMAT/EMS response unit(s) have the capability and equipment to perform speedy mass decontamination?

- Has appropriate precoordination been accomplished with hospitals and medical treatment facilities to establish medical treatment protocols, stock appropriate pharmaceuticals, and determine medical treatment procedures and equipment requirements?

- Do local hospitals and medical treatment centers have the capability to perform patient decontamination for large numbers of patients?

E. Chemical Agents

1. General. Chemical agents are compounds that, through their chemical properties, produce lethal or damaging effects on man. A chemical agent is defined as any chemical substance intended for use in military operations to kill, seriously injure, or incapacitate humans because of its physiological effects. Chemical agent symbols usually consist of two letters that are used as a designation to identify chemical agents (e.g., GA = Tabun) and have nothing to do with the chemical formula of the agent. Unlike biological agents, the onset of medical symptoms is measured in minutes to hours instead of days. Additionally, easily observed signatures such as colored residue and dead foliage, insects, and animals are present.

Persistency is an expression of the duration of effectiveness of a chemical agent. The level of persistency is used to describe the tactical use of chemical agents and should not be used as terms to technically classify the agent.

Nonpersistent Agents. Nonpersistent agents remain in the target for a relatively short period of time. The hazard, predominately vapor, will exist for minutes or, in exceptional cases, hours after dissemination of the agent. *As a general rule of thumb, nonpersistent agent duration will be less than 12 hours.*

Persistent Agents. Persistent agents remain in the target area for longer periods of time. Hazards from both vapors and liquids may exist for hours, days, or, in exceptional cases, weeks after dissemination of the agent. *As a general rule of thumb, persistent agent duration will be greater than 12 hours.* There are many factors that will affect the persistency of chemical agents.

- **Type of Agent**—Different agents have various consistencies or viscosities, ranging from rubbing alcohol to motor oil, and will evaporate or dissipate at approximately the same rate.

- **Amount of Agent**—Different amounts and dispersal of agents also impact the persistency of an agent.

- **Terrain**—The terrain (e.g., open area, vegetative, urban, soil composition, etc.) will also affect the duration of an agent. For example, terrorist use of a chemical agent would be most effective in enclosed spaces such as building entrances or underground subway platforms.

- **Weather**—Wind, temperature, humidity, and precipitation all impact on the duration of an agent.

2. Types. The following information is provided in order to give a general overview of chemical agents.

a. Nerve Agents. Chemical agents that affect the transmission of nerve impulses by reacting with the enzyme cholinesterase, permitting an accumulation of acetylcholine and continuous muscle stimulation. The muscles tire due to overstimulation and begin to contract. Nerve agents are colorless to light-brown liquids, some of which are volatile. Toxic liquids are tasteless. Nerve agents may be absorbed through the skin, respiratory tract, gastrointestinal tract, and the eyes; however, significant absorption through the skin takes a period of minutes, and prompt medical treatment and decontamination are imperative.

b. Choking Agents. Chemical agents that irritate the alveoli in the lungs. This irritation causes the alveoli to constantly secrete fluid into the lungs. The lungs slowly fill with this fluid (called pulmonary edema), and the victim dies from lack of oxygen (also known as dry land drowning).

c. Blood Agents. Chemical agents that act upon the enzyme cytochrome oxidase. This allows the red blood cells to acquire oxygen, but does not allow them to transfer oxygen to other cells. Body tissue decays rapidly due to lack of oxygen and retention of carbon dioxide (first the heart and then the brain are affected).

d. Blister Agents. Chemical agents that affect the eyes, respiratory tract, and skin, first as a cell irritant and then as a cell poison. Blister agents initially cause irritation of the eyes (and respiratory tract, if inhaled), erythema (reddening of the skin), then blistering or ulcerations, followed by systemic poisoning. There are three types of blister agents: mustards, arsenicals, and urticiants.

e. Incapacitating Agents. Agents that cause physiological or mental effects that lead to temporary disability lasting from hours to days after exposure to the agent has ceased.

f. Vomiting Agents. Compounds that cause irritation of the upper respiratory tract and involuntary vomiting.

g. Irritant or Tear Agents. Compounds that cause a large flow of tears and intense (although temporary) eye pain and irritation. The effects are immediate but transient.

Many highly technical defense systems against chemical agents have been developed. Protective gas masks combine particulate filters with substances that absorb gases and can remove a variety of toxic agents. Other protective devices include chemically treated clothing

and suits with portable ventilating systems and sealed and air-conditioned tanks and personnel carriers. In recent years chemical agent detectors have been developed that readily identify whether some agents are present.

The availability of antidotes and training of medical personnel to handle casualties are important defensive measures. Most are reasonably effective if some early warning is possible. In the absence of warning, a successful chemical attack would have an immediate impact on the jurisdiction of the affected area.

The possible mixing of chemical agents presents an additional concern to first responders in that it will be difficult to identify (by symptoms alone) which type of chemical agent is being used.

Another concern is that without advance warning, first responders may not be aware that they are dealing with a chemical incident. As a result, first responders may initially become victims in such an incident.

F. Biological Agents

1. General. Biological agents are more deadly than chemical agents and occur in nature as well as being developed. Large numbers of naturally occurring poisons have also been examined to determine their value as chemical warfare agents; these include capsaicin (an extract of cayenne pepper and paprika), ricin (a toxic substance found in the castor bean), and saxitoxin (a toxic substance secreted by certain shellfish). Of the many natural toxic materials, none has received more attention than the toxin of the common bacterium clostridium botulinum, which is sometimes ingested from food that has been improperly canned or preserved. A tiny quantity can produce death. Sprayed in the air or introduced into a water system, it might prove to be a highly effective agent.

2. Types. Biological agents generally fall into one of three types:

a. Pathogens—Living, reproducing, disease-producing organisms.

- **Bacteria.** Capable of reproducing outside living cells. (Examples: anthrax, tularemia, bubonic plague, cholera, and typhoid fever.)

- **Viruses.** Infective agents composed of deoxyribonucleic acid (DNA) or ribonucleic acid (RNA) that can only reproduce inside living cells. (Examples: Venezuelan equine encephalitis [VEE], yellow fever, smallpox, hemorrhagic fever [Marburg and Ebola], and human immunodeficiency virus [HIV].)

- **Rickettsia.** Parasitic microorganisms whose diseases are transmitted by the bite of ticks, lice, and fleas. These parasites require a living host as opposed to bacteria. (Examples: Rocky Mountain spotted fever, Q fever, and flea-borne typhus.)

- **Yeasts** and **Fungi**.

- **Genetically Engineered Pathogens.** Through advanced biotechnical techniques, pathogens are subject to enhancement to increase their utility. (Examples: antibiotic-resistant bacteria, bacteria genetically altered to have advanced aerosol and environmental durability, and immunologically altered viruses resistant to standard vaccines and not identifiable to classical serological means.)

b. Toxins—Non-living, poisonous chemical compounds produced through the metabolic activities of living organisms. (Examples: snake venom, scorpion venom, ricin, saxitoxin [produced by marine algae], and puffer fish venom.) Toxins are 1,000 times more lethal or effective than standard chemical agents.

c. Endogenous Biological Regulators (EBRs)—Chemical substances produced in the body to regulate various body functions such as muscle contraction, blood pressure, heart rate, temperature, and immune responses. *(*Examples: hormones, adrenaline, and delta sleep-inducing peptide.)

Exposure to biological agents, unlike chemical agents, may not be immediately apparent. Casualties may occur minutes or hours to days or weeks after an incident has occurred. The time required before symptoms are observed is dependent on the agent used. There is currently only a limited capability to detect and identify the presence of biological agents, though work continues on developing such devices. Often the first clue will come from blood tests, or by other means used by medical personnel, or by observing possible symptoms of people exposed in the area.

G. Radiological Materials

1. General. Radiation is defined as high-energy particles or gamma rays that are emitted by an atom as the substance undergoes radioactive decay, which is the process in which a radioactive nucleus emits radiation and changes to a different isotope or element. The types of radiation are in the following forms of energetic particles:

- Alpha particles
- Beta particles
- Photons (gamma rays and x-rays)
- Neutrons

Particles lose their energy by depositing it in the material they move through, whether that material is air, water, people, or lead. Alpha particles deposit all their energy in a very short distance; very little protective material is required from alpha particles. Beta particles require slightly more shielding; gamma rays and x-rays require much more shielding. Neutrons react with matter differently than do most other kinds of radiation. They are more easily “stopped” by materials with low atomic numbers or “low Z materials” like carbon, lithium, or water.

Radiation, regardless of intensity, has the potential to produce harmful effects on human beings. Background (natural) radiation poses little threat to our systems; however, serious health consequences can be expected if a person is subjected to large amounts of radiation.

2. Types. The types of radiation and their effects are as follows.

a. ALPHA (particulate) radiation particles cannot penetrate the outer layer of skin. They can be stopped by thin layers of light materials, such as a sheet of paper, and pose no direct or external radiation threat*; however, they pose a serious health threat if ingested*. Since the largest threat is inhalation, protective clothing is not required; however, a respirator or the use of a Self-Contained Breathing Apparatus (SCBA) is recommended. The range in air for alpha particles is 1 to 3 centimeters.

b. BETA (particulate) radiation particles can penetrate skin, but not vital organs (e.g., lungs, gastrointestinal tract, heart, etc.) and represent a hazard both internally and externally. Beta radiation can be lethal depending upon the dose and length of time of exposure. It is easily shielded by aluminum. The range in air for beta particles is approximately 10 feet. Initial symptoms are itching and burning of the skin with later symptoms that include reddening of the skin and changes in pigmentation, epilation, and sores.

c. GAMMA (energy) and **NEUTRON** radiation particles can penetrate through the body and represent a hazard both internally and externally. These rays have high energy and a short wavelength. Shielding against gamma radiation requires thick layers of dense materials, such as lead. Gamma and neutron radiation typically have a range in air of several hundred feet.

The problem with radiation is that it is an invisible hazard. Unless the responding public safety agency has radiological detection equipment, or the nuclear material at issue is clearly marked and identified, there is a strong chance that the initial identification of a radiological or nuclear hazard will go unnoticed. Additionally, there is no one piece of equipment available on the market to meet all detection requirements; however, there are separate detectors for each type of radiation. An additional concern would be the availability of protective clothing and breathing gear, in sufficient quantities, to protect first responders.

Radiation, regardless of intensity, has the potential to produce harmful effects on humans, animals, and plant life. When first responders are subjected to large amounts of radiation due to major radiation accidents or nuclear attack, they can expect serious consequences to their health. Radiation sickness is similar to any other illness in the body. The “disease” is just radiation. *It should be noted that individuals suffering from radiation injuries are NOT radioactive!!*

Of importance is the dose or amount of radiation absorbed over a period of time. There are many terms used to measure a dose of radiation; one is the roentgen man equivalent (rem), which is a unit of absorbed dose that takes into account the relative effectiveness of the radiation involved in causing health effects. Another measurement of the absorbed dose of radiation is known as rad, though it is being replaced by a measurement known as Gray, which is the equivalent of 100 rad. In this document, health effects are expressed in rad.

- 50 to 200 rad—Approximately 6 hours after exposure, the individual may have symptoms ranging from none to transient mild headaches. There may be a slight decrease in the ability to conduct normal activities. Less than 5 percent of individuals in the upper part of the exposure range will require hospitalization. Average hospital stay will be 45 to 60 days, with no deaths.

- 200 to 500 rad—Approximately 4 to 6 hours after exposure, individuals will experience headaches, malaise, nausea, and vomiting. Symptoms are not relieved by antiemetics in the upper exposure range. Individuals can perform routine tasks, but any activity requiring moderate to heavy exertion will be hampered for 6 to 20 hours. After this period, individuals will appear to recover and enter a latent period of 17 to 21 days. If individuals have received 300 rads or more, they will have large quantities of hair loss between 12 to 18 days after exposure. Following the latent stage, symptoms will return, requiring 90 percent of the personnel to be hospitalized for 60 to 90 days. Probably less than 5 percent of those at the lower dose range will die, the percentage increasing toward the upper end of the dose range.

- 500 to 1,000 rad—Approximately 1 to 4 hours after exposure, severe and prolonged nausea and vomiting will develop that are difficult to control. Diarrhea and fever develop early in individuals in the upper part of the exposure range. Significant incapacitation is seen in the upper ranges. Initial symptoms last for more than 24 hours, then go into a latent period lasting 7 to 10 days. Following the latent stage, the symptoms return requiring 100 percent of the individuals to be hospitalized. Of those in the lower range, 50 percent will die, the percentage increasing toward the upper range. All deaths occur within 45 days. The survivors require 90 to 120 days of hospitalization before recovery.

- 1,000 rad or more—Less than 1 hour after exposure, individuals develop severe vomiting, diarrhea, and prostration. There is no latent period. All individuals require hospitalization and die within 30 days.

THIS PAGE IS INTENTIONALLY LEFT BLANK

ANNEX E

THE FEDERAL AND STATE RESPONSE TO TERRORISM

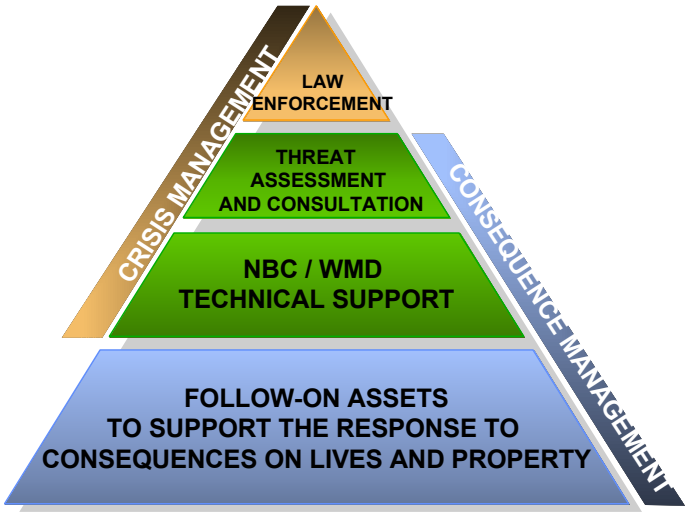
A. FEDERAL

1. Introduction

Presidential Decision Directive (PDD)-39, U.S. Policy on Counterterrorism, establishes policy to reduce the Nation's vulnerability to terrorism, deter and respond to terrorism, and strengthen capabilities to detect, prevent, defeat, and manage the consequences of terrorist use of weapons of mass destruction (WMD). PDD-39 states that the United States will have the ability to respond rapidly and decisively to terrorism directed against Americans wherever it occurs, arrest or defeat the perpetrators using all appropriate instruments against the sponsoring organizations and governments, and provide recovery relief to victims, as permitted by law.

Responding to terrorism involves instruments that provide crisis management and consequence management. "Crisis management" refers to measures to identify, acquire, and plan the use of resources needed to anticipate, prevent, and/or resolve a threat or act of terrorism. The Federal Government exercises primary authority to prevent, preempt, and terminate threats or acts of terrorism and to apprehend and prosecute the perpetrators; State and local governments provide assistance, as required. Crisis management is predominantly a law enforcement response. "Consequence management" refers to measures to protect public health and safety, restore essential government services, and provide emergency relief to governments, businesses, and individuals affected by the consequences of terrorism. State and local governments exercise primary authority to respond to the consequences of terrorism; the Federal Government provides assistance, as required. Consequence management is generally a multifunction response coordinated by emergency management.

Based on the situation, a Federal crisis management response may be supported by technical operations and by Federal consequence management, which may operate concurrently. "Technical operations" include actions to identify, assess, dismantle, transfer, dispose of, or decontaminate personnel and property exposed to explosive ordnance or WMD.



source: DHHS-PHS / FEMA

Relationship between Crisis Management and Consequence Management

2. Policies

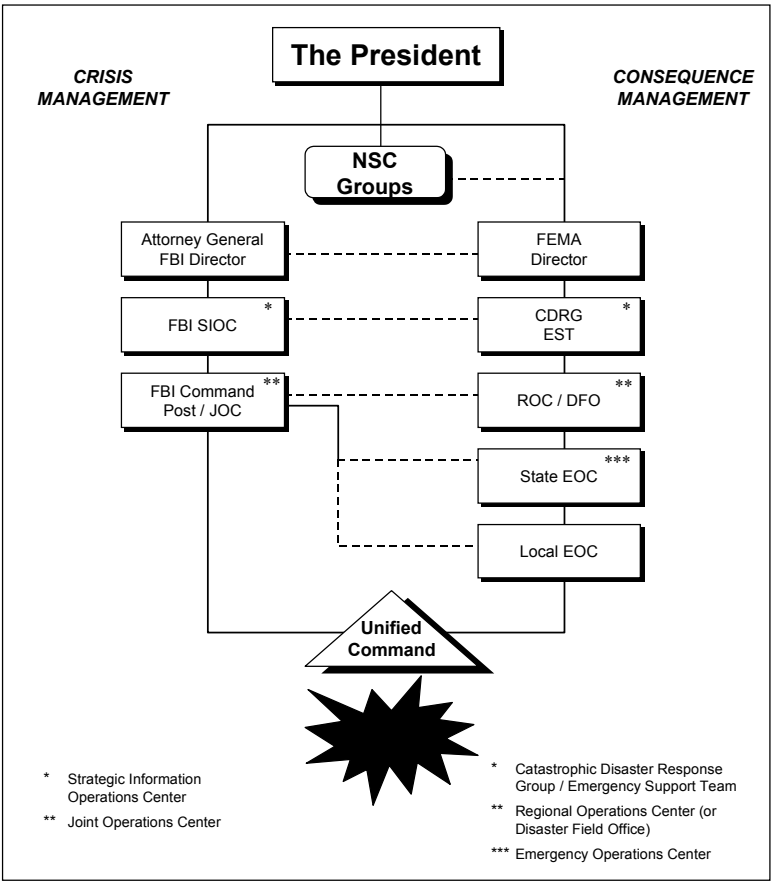
a. PDD-39 validates and reaffirms existing lead agency responsibilities for all facets of the U.S. counterterrorism effort.

b. The Department of Justice (DOJ) is designated as the lead agency for threats or acts of terrorism within U.S. territory. The DOJ assigns lead responsibility for operational response to the Federal Bureau of Investigation (FBI). Within that role, the FBI operates as the on-scene manager for the Federal Government. It is FBI policy that crisis management will involve only those Federal agencies requested by the FBI to provide expert guidance and/or assistance, as described in the PDD-39 Domestic Deployment Guidelines and the FBI WMD Incident Contingency Plan.

c. The Federal Emergency Management Agency (FEMA) is designated as the lead agency for consequence management within U.S. territory. FEMA retains authority and responsibility to act as the lead agency for consequence management throughout the Federal response. It is FEMA policy to use Federal Response Plan (FRP) structures to coordinate all Federal assistance to State and local governments for consequence management.

d. To ensure that there is one overall Lead Federal Agency (LFA), PDD-39 directs FEMA to support DOJ (as delegated to the FBI) until the Attorney General transfers the overall LFA role to FEMA. FEMA supports the overall LFA as permitted by law.

Coordinating the Federal Response between CRISIS (FBI) and CONSEQUENCE (FEMA) Management Lead Federal Agencies



South Carolina WMD FOG

Federal Policies and Plan
Governing the Federal Response
To Terrorism

Policies:

Presidential Decision Directives -39 and -62

Domestic Guidelines

(U.S. Policy on Counterterrorism)

Plans:

FBI WMD Incident Contingency Plans

(56 FBI Field Offices)

Federal Response Plan — *(FRP)*

Terrorism Incident Annex

(27 Federal Agencies) *(6 Key Agencies)*

U.S. Government Federal Interagency Domestic Terrorism Concept of Operations Plan (CONOPS)

(6 Key Agencies)

(Overall concept to coordinate Crisis and Consequence operations)

C23-C

C39-B

South Carolina WMD FOG

Key Players
in the
Federal Response to Threats or
Acts of Terrorism

The following six Federal agencies have been directed by Presidential Decision Directives to *develop capabilities to detect, prevent, defeat, and manage* the consequences of terrorist use of nuclear, biological, or chemical materials and weapons.

FBI – Lead Agency with authority to manage and coordinate the Federal crisis management response.

FEMA – Lead Agency with authority to manage and coordinate the Federal consequence management response.

DoD – Supporting Agency that provides military support to civil authorities.

DOE – Supporting Agency that provides response to radiological or nuclear material.

DHHS – Supporting Agency that provides response to biological material and other medical requirements.

EPA – Supporting Agency that provides response to hazardous materials (HAZMAT).

3. Funding Guidelines

a. As stated in PDD-39, Federal agencies directed to participate in the resolution of terrorist incidents or conduct of counterterrorist operations bear the costs of their own participation, unless otherwise directed by the President. This responsibility is subject to specific statutory authorization to provide support without reimbursement. In the absence of such specific authority, the Economy Act applies, and reimbursement cannot be waived.

b. FEMA can use limited predeployment authorities in advance of a Stafford Act declaration to "lessen or avert the threat of a catastrophe" only if the President expresses intention to go forward with a declaration. This authority is further interpreted by Congressional intent, to the effect that the President must determine that assistance under existing Federal programs is inadequate to meet the crisis, before FEMA may directly intervene under the Stafford Act. The Stafford Act authorizes the President to issue "emergency" and "major disaster" declarations.

(1) Emergency declarations may be issued in response to a Governor's request, or in response to those rare emergencies, including some acts of terrorism, for which the Federal Government is assigned in the laws of the United States the exclusive or preeminent responsibility and authority to respond.

(2) Major disaster declarations may be issued in response to a Governor's request for any natural catastrophe or, regardless of cause, any fire, flood, or explosion that has caused damage of sufficient severity and magnitude, as determined by the President, to warrant major disaster assistance under the Act.

(3) If a Stafford Act declaration is provided, funding for consequence management may continue to be allocated from responding agency operating budgets, the Disaster Relief Fund, and supplemental appropriations.

c. If the President directs FEMA to use Stafford Act authorities, FEMA will issue mission assignments through the FRP to support consequence management.

(1) Mission assignments are reimbursable work orders, issued by FEMA to Federal agencies, directing completion of specific tasks. Although the Stafford Act states that "Federal agencies may be reimbursed for expenditures under the Act" from the Disaster Relief Fund, it is FEMA policy to reimburse Federal agencies for eligible work performed under mission assignments.

(2) Mission assignments issued to support consequence management will follow FEMA's Standard Operating Procedures for the Management of Mission Assignments or applicable superseding documentation.

d. FEMA provides the following funding guidance to the FRP agencies.

(1) Commitments by individual agencies to take precautionary measures in anticipation of special events will not be reimbursed under the Stafford Act, unless mission assigned by FEMA to support consequence management.

(2) Stafford Act authorities do not pertain to law enforcement functions. Law enforcement or crisis management actions will not be mission assigned for reimbursement under the Stafford Act.

B. SOUTH CAROLINA EMERGENCY OPERATIONS

1. General

It is the policy of the State of South Carolina to be prepared for any emergency or disaster. Emergency response personnel, equipment, and facilities will be maintained in a state of readiness to save lives, prevent or minimize damage to property, and provide assistance to all people who are threatened by an emergency or who become victims of any disaster. Emergency operations will be coordinated to the maximum extent with comparable activities of local governments, other States, the Federal Government, and private agencies of every type. The level and duration of State commitment of resources shall be determined by the Governor.

2. Mission

State government has a five-fold mission:

a. To warn of impending danger.

b. When required, support local government disaster operations with timely, effective deployment of state resources.

c. Through the public information process, keep affected residents informed about the situation and how they can protect themselves.

d. Coordinate and direct restoration and recovery operations when local government resources are exhausted.

e. Assess local needs and coordinate support from adjacent States and the Federal Government as necessary and appropriate.

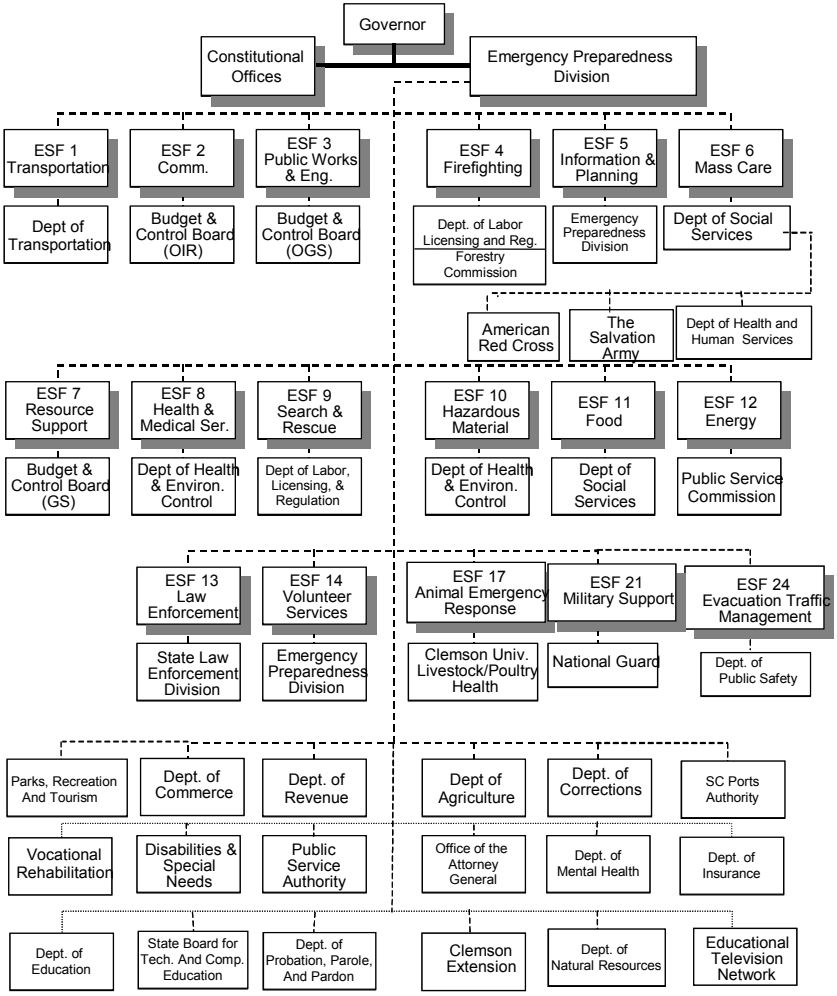
Appendix:

A. South Carolina Organization for Emergency Operations

THIS PAGE IS INTENTIONALLY LEFT BLANK

APPENDIX A

SOUTH CAROLINA ORGANIZATION FOR EMERGENCY OPERATIONS



THIS PAGE IS INTENTIONALLY LEFT BLANK

NOTES

THIS PAGE IS INTENTIONALLY LEFT BLANK

ANNEX F

GLOSSARY

Absorption. The process of an agent being taken in by a surface (e.g., clothing, fabrics, wood, etc.) much like a sponge and water.

Actual Breakthrough Time. The average time elapsed between initial contact of the chemical with the outside surface of the fabric and the detection time.

Acetylcholine. A chemical compound formed from an acid and an alcohol that causes muscles to contact (neurotransmitter). It is found in various organs and tissues of the body. It is rapidly broken down by an enzyme, cholinesterase.

Acetylcholinesterase. An enzyme that hydrolyses the neurotransmitter acetylcholine. The action of this enzyme is inhibited by nerve agents.

Adsorption. The process of an agent sticking to or becoming chemically attached to a surface.

Aerosol. Fine liquid or solid particles suspended in air; for example, fog or smoke.

Agent Dosage. The concentration of a toxic vapor in the air multiplied by the time that the concentration is present.

Antibiotic. A substance that inhibits the growth of or kills microorganisms.

Anticholinergic. An agent or chemical that blocks or impedes the action of acetylcholine, such as the (also cholinolytic) antidote atropine.

Anticholinesterase. A substance that blocks the action of cholinesterase (acetylcholinesterase) such as nerve agents.

Antidote. A substance that neutralizes toxic agents or their effects.

Antisera. A liquid part of blood containing antibodies.

Arsenical. Pertaining to or containing arsenic; a reference to the vesicant lewisite.

Atropine. (1) A medication used as an antidote for nerve agents. (2) An anticholinergic used as an antidote for nerve agents to counteract excessive amounts of acetylcholine. It also has other medical uses.

Bacteria. Single-celled organisms that multiply by cell division and that can cause disease in humans, plants, or animals.

Battle Dress Overgarment (BDO). A multi-piece suit used by the military for protection against chemical warfare agents.

Biochemicals. The chemicals that make up or are produced by living things.

Biological Warfare. The intentional use of biological agents as weapons to kill or injure humans, animals, or plants or to damage equipment.

Biological Warfare Agents. Living organisms or the materials derived from them that cause disease in or harm humans, animals, or plants or cause deterioration of material. Biological agents may be used as liquid droplets, aerosols, or dry powders.

Bioregulators. Biochemicals that regulate bodily functions. Bioregulators that are produced by the body are termed "endogenous." Some of these same bioregulators can be chemically synthesized.

Blister Agent. A chemical warfare agent that produces local irritation and damage to the skin (vesicant) and mucous membranes, pain and injury to the eyes, reddening and blistering of the skin, and when inhaled, damage to the respiratory tract.

Blood Agent. A chemical warfare agent that is inhaled and absorbed into the blood. The blood (cyanogen) carries the agent to all body tissues where it interferes with the tissue oxygenation process.

B-NICE. Pertaining to biological, nuclear, incendiar, chemical, or explosives.

Causative Agent. The organism or toxin that is responsible for causing a specific disease or harmful effect.

Ceiling Exposure Value. The maximum airborne concentration of a biological or chemical agent to which a worker may be exposed at any time.

Central Nervous System (CNS).

Chemical Abstract Service (CAS) Registry Number. A number assigned to a material by the CAS to provide a single unique identifier.

Chemical Agent. A chemical substance that is intended for use in military operations to kill, seriously injure, or incapacitate people through its physiological effects. Excluded from consideration are riot control agents and smoke and flame materials. The agent may appear as a vapor, aerosol, or liquid; it can either be a casualty/toxic agent or an incapacitating agent.

Chemical Agent Symbol. A code, usually consisting of two letters, that is used as a designation to identify chemical agents (e.g., GB for the chemical agent sarin).

Chemical Contamination. The presence of a chemical agent on a person, object, or area.

Choking Agents. (1) Substances that cause physical injury to the lungs. Exposure is through inhalation. In extreme cases, membranes swell and lungs become filled with liquid. Death results from lack of oxygen; hence the victim is "choked." (2) These agents exert their

effects soley on the lungs and result in the irritation of the alveoli of the lungs. Agents cause the alveoli to constantly secrete watery fluid into the air sacs, which is called pulmonary edema. When a lethal amount of a choking agent is received, the air sacs become so flooded that the air cannot enter and the victim dies of anoxia (oxygen deficiency); also known as dry land drowning.

Classification of Chemical Agents. Chemical agents are classified according to their physical state, use, and physical action.

CNS Depressants. Compounds that have the predominant effect of depressing or blocking the activity of the CNS. The primary mental effects include the disruption of the ability to think, sedation, and lack of motivation.

CNS Stimulants. Compounds that have the predominant effect of flooding the brain with too much information. The primary mental effect is loss of concentration, causing indecisiveness and the lack of ability to act in a sustained, purposeful manner.

Concentration. The amount of a chemical agent present in a unit volume of air, usually expressed in milligrams per cubic meter (mg/m^3).

Concentration Time. The amount of a chemical agent present in a unit volume of air multiplied by the time an individual is exposed to that concentration.

Conjunctivitis. Redness in the eye.

Consequence Management. Measures to alleviate the damage, loss, hardship, or suffering caused by emergencies. It includes measures to restore essential Government service, protect public health and safety, and provide emergency relief to affected governments, businesses, and individuals.

Contagious. Capable of being transmitted from one person to another.

Containment. The attempt to prevent the spreading of contamination by holding it in, enclosing, encapsulating, or controlling it.

Crisis Management. Measures to resolve the hostile situation, investigate, and prepare a criminal case for persecution under Federal law.

Cryogenics. Materials that exist at extremely low temperatures, such as nitrogen.

Culture. A population of microorganisms grown in a medium.

Cumulative. Additional exposure rather than repeated exposure. For example, a 1-hour exposure of HD followed within a few hours by another exposure of 1 hour, had the same effect as a single exposure lasting for 2 hours.

Cutaneous. Pertaining to the skin.

Decontamination. The process of making any person, object, or area safe by absorbing, destroying, neutralizing, making harmless, or removing the hazardous materials (HAZMAT).

Desorption. The reverse process of absorption. The agent will be "removed" from the surface (outgassing).

Dilution Factor. Dilution of contaminated air with uncontaminated air in a general area, room, or building for the purpose of health hazard or nuisance control, and/or for heating and cooling.

Dosage. The concentration of a chemical agent in the atmosphere (C) multiplied by the time (t) the concentration remains, expressed as mg-min/m. The dosage (Ct) received by a person depends upon how long he is exposed to the concentration. That is, the respiratory dosage in mg-min/m is equal to the time in minutes as the individual is unmasked in an agent cloud multiplied by the concentration of the cloud. The dosage is equal to the time of exposure in minutes of an individual's unprotected skin multiplied by the concentration of the agent cloud.

Downwind Distance. The distance a toxic agent vapor cloud will travel from its point of origin, with the wind.

Evaporation Rate. The rate at which a liquid changes to vapor at normal room temperature.

Fungi. Any group of plants mainly characterized by the absence of chlorophyll, the green colored compound found in other plants. Fungi range from microscopic single-celled plants (such as mold and mildew) to large plants (such as mushrooms).

G-Series Nerve Agents. Chemical agents moderate to high toxicity developed in the 1930s. Examples are tabun (GA), sarin (GB), and soman (GD).

Host. An animal or plant that harbors or nourishes another organism. Concentrations immediately dangerous to life and health (IDLH).

Hydration. The combining of a substance with water.

Hydrolysis. The reaction of any chemical substance with water by which decomposition of the substance occurs and one or more new substances are produced.

IDLH. Concentrations immediately dangerous to life and health.

Incapacitating Agents. Produce temporary physiological and/or mental effects via action on the central nervous system. Effects may persist for hours or days, but victims usually do not require medical treatment; however, such treatment speeds recovery.

Industrial Agents. Chemicals developed or manufactured for use in industrial operations or research by industry, government, or academia. These chemicals are not primarily manufactured for the specific purpose of producing human causalities or rendering equipment, facilities, or areas dangerous for use by man. Hydrogen cyanide, cyanogen chloride, phosgene, chloropicrin, and many herbicides and pesticides are industrial chemicals that can also be chemical agents.

Infectious Agents. Biological agents capable of reproducing in an infected host.

Infectivity. (1) The ability of an organism to spread. (2) The number of organisms required to cause an infection to secondary hosts. (3) The capability of an organism to spread out from the site of infection and cause disease in the host organism. Infectivity can also be viewed as the number of organisms required to cause an infection.

Initial Downwind Vapor Hazard Area. Areas initially established to evacuate all unprotected personnel and to prevent other unprotected personnel from entering and thus encountering agent vapors or any other type of contamination.

Integrated Emergency Command Structure (IECS). A system that allows for the integration of both career and volunteer fire/rescue personnel by equal rank for purposes of an on-scene incident command. (Montgomery County Fire Service definition.)

Latent Period. Specifically, in the case of mustard, the period between exposure and onset of signs and symptoms; otherwise, an incubation period.

Lethal Chemical Agent. An agent that may be used effectively in a field concentration to produce death.

Level A Protection. The level of protective equipment in situations where the material is considered acutely vapor toxic to the skin and hazards are unknown. Full encapsulation, air tight chemical suit with Self-Contained Breathing Apparatus (SCBA) or Supplied Air Breathing Apparatus (SABA).

Level B Protection. The level of protective equipment in situations where the environment is not considered acutely vapor toxic to skin but may cause respiratory effects. Chemical splash suit or full coverage non-air tight chemical suit with SCBA or SABA.

Level C Protection. The level of protective equipment required to prevent respiratory exposure but not to exclude possible skin contact. Chemical splash suit with cartridge respirator.

Level D Protection. The level of protective equipment required when the atmosphere contains no known hazard; when splashes, immersions, inhalation, or contact with hazardous levels of any chemical is precluded. Work uniform such as coveralls, boots, leather gloves, and hard hat.

Liquid Agent. A chemical agent that appears to be an oily film or droplets. The color ranges from clear to brownish amber.

M8 Chemical Agent Detector Paper. A paper used to detect and identify liquid V- and G-type nerve agents and H-type blister agents.

M256 kit. A kit that detects and identifies vapor concentrations of nerve, blister, and blood agents.

Median Incapacitating Dosage (ICT_{50}). The volume of a chemical agent vapor or aerosol inhaled that is sufficient to disable 50 percent of exposed, unprotected people (expressed as mg-min/m^3).

Median Incapacitating Dosage (ID_{50}). The volume of a liquid chemical agent expected to incapacitate 50 percent of a group of exposed, unprotected individuals.

Median Lethal Dosage (LCT_{50}). The amount of liquid chemical agent expected to kill 50 percent of a group of exposed, unprotected individuals.

Methods of Dissemination. The way a chemical agent or compound is finally released into the atmosphere.

Microorganism. Any organism such as bacteria, viruses, and some fungi, that can be seen only with a microscope.

Miosis. A condition where the pupil of the eye becomes contracted (pinpointed), which impairs night vision.

Mustard (Vesicants) Agents. See Blister agent.

Mycotoxin. A toxin produced by fungi.

Nerve Agents. Substances that interfere with the central nervous system. Exposure is primarily through contact with the liquid (skin and eyes) and secondarily through inhalation of the vapor. Three distinct symptoms associated with nerve agents are pinpoint pupils, an extreme headache, and severe tightness in the chest.

Nonresistant Agent. An agent that, upon release, loses its ability to cause casualties after 10 to 15 minutes. It has a high evaporation rate and is lighter than air and will disperse rapidly. It is considered to be a short-term hazard; however, in small unventilated areas, the agent will be more persistent.

NBC. Nuclear, Biological, and Chemical.

Organism. Any individual living thing, whether animal or plant.

Organophosphate. A compound with a specific phosphate group that inhibits acetycholinesterase. Used in chemical warfare and as an insecticide.

Organophosphorus Compound. A compound containing the elements phosphorus and carbon, whose physiological effects include inhabitation of acetylcholinesterase. Many pesticides (malathion and parathion), and virtually all nerve agents, are organophosphorus compounds.

Parasite. Any organism that lives in or on another organism without providing benefit in return.

Pathogen. Any organism (usually living) capable of producing serious disease or death, such as bacteria, fungi, and viruses.

Pathogenic Agent. Biological agents capable of causing serious diseases.

Percutaneous Agent. Able to be absorbed through the body.

Permeation. The process by which a chemical moves through a protective clothing.

Permeation Rate. The rate at which the challenge chemical permeates the fabric.

Permissible Exposure Limit (PEL). An occupational health term used to describe exposure limits for employees. Usually described in Time-Weighted Averages (TWAs) or Short-Term Exposure Limits (STELs).

Persistent Agent. An agent that remains in the target area for longer periods of time. Hazards from both vapor and liquid may exist for hours, days, or in exceptional cases, weeks or months after dissemination of the agent. As a general rule, persistent agent's duration will be greater than 12 hours.

Physiological Action. Most toxic chemical agents are used for their toxic effects, that is, to produce a harmful physiological reaction when applied to the human body externally, or when breathed or taken internally. This reaction of chemical agents, within the body or on the body, is the physiological action.

Precursor. A chemical substance required for the manufacture of chemical agent.

Rad. A measurement of the absorbed dose of radiation is known as rad.

Rate of Action. The rate at which the body reacts to or is affected by a chemical substance or material.

Rate of Detoxification. The rate at which the body can counteract the effects of a poisonous chemical substance.

Rate of Hydrolysis. The rate at which the various chemical agents or compounds are decomposed by water.

Reconnaissance (RECON). A primary survey to gather information.

Respiratory Dosage. This is equal to the time in minutes an individual is unmasked in an agent cloud multiplied by the concentration of the cloud.

Rhinorrhea. A runny nose.

Rickettsia. Any of a family (Rickettsiaceae) of pleomorphic rod-shaped nonfilterable microorganisms that cause various diseases (as typhus).

SCBA. Self-Contained Breathing Apparatus.

Sensitize. To become highly responsive or easily receptive to the effects of toxic chemical agents after the initial exposure.

Skin Dosage. This is equal to the time of exposure in minutes of an individual's unprotected skin multiplied by the concentration of the agent cloud.

Solubility. The ability of a material to dissolve in water or another liquid.

Solvent. A material that is capable of dissolving another chemical.

Source Strength. The weight of a chemical agent that is at the chemical accident/incident site and may be released into the environment.

Specific Gravity. The weight of a liquid compared to the weight of an equal volume of water.

Spore. A reproductive form some microorganisms can take to become resistant to environmental conditions, such as extreme heat or cold, while in a "resting phase."

SABA. Supplied Air Breathing Apparatus.

Tear Agents. Produce irritating or disabling effects such as a large flow of tears and intense eye pain and irritation of the skin that rapidly disappear within minutes after exposure.

Terrorism. A violent act or an act dangerous to human life, in violation of the criminal laws of the United States or any segment to intimidate or coerce a government, the civilian population or any segment thereof, in furtherance of political or social objectives. (U.S. Department of Justice)

Time-Weighted Average (TWA). The average concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed without adverse effect.

Toxicity. (1) A measure of the harmful effect produced by a given amount of toxin on a living organism. The relative toxicity of an agent can be expressed in milligrams of toxin needed per kilogram of body weight to kill experimental animals. (2) The property a material possesses that enables it to injure the physiological mechanism of an organism by chemical means, with the maximum effect being incapacitation or death.

Triage. Sorting. A technique of establishing rescue, decontamination, treatment, and transportation priorities in any event where the number of casualties overwhelm the resources of the emergency response organizations.

Upwind. In or toward the direction from which the wind blows. To be upwind of an item, the wind would be blowing from your position to the item.

Urticant. A chemical agent that produces irritation at the point of contact, resembling a stinging sensation, such as a bee sting. For example, the initial physiological effects of phosgene oxime (CX) upon contact with a person's skin.

Urticaria. A skin condition characterized by intensely itching, red, raised patches.

Vaccine. A preparation of killed or weakened microorganism products used to artificially induce immunity against a disease.

Vapor Agent. A gaseous form of a chemical agent. If heavier than air, the cloud will be close to the ground; if lighter than air, the cloud will rise and disperse more quickly.

Vapor Density. A comparison of any gas or vapor to the weight of an equal amount of air.

Vesicant Agent. An agent that acts on the eyes and lungs and blisters the skin.

Vesicles. Blisters on the skin.

Virus. An infectious microorganism that exists as a particle rather than as a complete cell. Particle sizes range from 200 to 400 manometers (one-billionth of a meter). Viruses are not capable of reproducing outside of a host cell.

Viscosity. The degree to which a fluid resists flow.

Volatility. (1) A measure of how readily a substance will vaporize. (2) With chemical agent, it refers to their ability to change from a liquid state into a gaseous state. (The ability of a material to evaporate.)

Vomiting Agents. Produce nausea and vomiting affects; can also cause coughing, sneezing, pain in the nose and throat, nasal discharge, and tears.

V-Series Nerve Agents. Chemical agents of the moderate to high toxicity developed in the 1950s. They are generally persistent.

Wheal. An acute swelling of the skin. This condition is common to a bee sting.

THIS PAGE IS INTENTIONALLY LEFT BLANK

ANNEX G

REFERENCES

Government Publications

1996 North American Emergency Response Guidebook, U.S. Department of Transportation, Transport Canada, and Secretariat of Transport and Communications (Mexico).

Burdick, Brett A., ed. *Hazardous Materials Training/Public Safety Response to Terrorism, Student Manual.* Virginia Department of Emergency Services, Richmond, VA, 1997.

Franz, D.R. *Defense Against Toxic Weapons,* U.S. Army Medical Research Institute of Infectious Diseases.

Johnson, Stuart and Lewis, William. *Weapons of Mass Destruction: New Perspectives on Counterproliferation.* U.S. Government Printing Office, Washington, DC.

CDC Recommendations for Civilian Communities Near Chemical Weapon Stockpile Preparedness; Notice. *Federal Register,* June 27, 1995, Department of Health and Human Services, Centers for Disease Control and Prevention.

Commonwealth of Virginia Emergency Operations Plan. Virginia Department of Emergency Services.

Control of Communicable Diseases Manual, Sixteenth Edition, American Public Health Association, 1995.

Emergency Care and Transportation of the Sick and Injured, fifth edition. American Academy of Orthopedic Surgeons, 1993.

Emergency Response Guidebook. U.S. Department of Transportation. Washington, DC, 1993.

Emergency Room Procedures in Chemical Hazard Emergencies. U.S. Department of Health and Human Services, CDC, Public Health Service.

Emergency Room Procedures in Chemical Hazard Emergencies, A Job Aid. U.S. Department of Health and Human Services, CDC, Public Health Service.

The Federal Response Plan, for Public Law 93-288, as amended, Federal Emergency Management Agency, 1992.

Guidelines for the Cleanup of Clandestine Drug Laboratories. Joint Federal Task Force – DEA, EPA and USCG, March 1990.

Hazard Communication; Final Rule – 29 CFR Part 1910, et al. *Federal Register,* February 9, 1994, Department of Labor, Occupational Safety and Health Administration.

Hazardous Materials Incident Management, course manual. Virginia Department of Emergency Services, 1995.

Hazardous Materials Technician, course manual. Virginia Department of Emergency Services, 1995.

Medical Management of Chemical Casualties Handbook, U.S. Army, Medical Research Institute of Chemical Defense.

Medici, John and Patrick, Steve. *Emergency Response to Incidents Involving Chemical and Biological Warfare Agents.* Virginia Department of Emergency Services, Richmond, VA, 1996.

Patterns of Global Terrorism, U.S. Department of State, Publication 10239, Office of the Secretary of State, 1994.

Patterns of Global Terrorism, U.S. Department of State, Publication 10239, Office of the Secretary of State, 1995.

Planning Guidance for the Chemical Stockpile Emergency Preparedness Program. Federal Emergency Management Agency and the Department of the Army, 1992.

Proceedings of the Seminar on Responding to the Consequences of Chemical and Biological Terrorism, July 11-14, 1995, U.S. Public Health Service, Office of Emergency Preparedness.

Rhea, Steve. *Emergency Response to Bombing Incidents.* Virginia Department of Emergency Services, Richmond, VA, 1996.

Responding to the Consequences of Chemical and Biological Terrorism. (Workshop) Rockville, MD: U.S. Public Health Service, Office of Emergency Preparedness, July 1995.

Terrorism in the United States. Terrorist Research and Analytical Center, National Security Division, 1994.

Terrorism in the United States. U.S. Department of Justice, Terrorism Research and Analytical Center, 1995.

Significant Incidents of Political Violence Against Americans. U.S. State Department, Bureau of Diplomatic Security.

USAMRICD Technical Memorandums 90-1, 90-2, 90-3.1990, U.S. Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, MD.

Books

Bronstein, Alvin C. and Phillip L. Currance. *Emergency Care for Hazardous Materials Exposure.* Mosby Year Book, Inc., St. Louis, MO.

Carder, Thomas A. *Handling of Radiation Accident Patients by Paramedical and Hospital Personnel.* CRC Press, Inc., Boca Raton, FL.

Cole, L.A. *The Eleventh Plague.* W. H. Freeman & Co., p. 284

Gonzales, Jo Jo. *Deathtrap! Improvised Booby-Trap Devices.* Paladin Press, Boulder, CO.

McLean, Don. *Medicine Chest Explosives, An Investigators Guide to Chemicals Used in Home-Cooked Bombs.* Paladin Press, Boulder, CO.

Sanford, Victor. *Disruptive Terrorism.* Loompanics Unlimited, Port Townsend, WA.

Santoro, Victor. *Disruptive Terrorism.* 1984.

Sawicki, Jack. *"Draft" Report on Chemical Warfare Agents.* Geomet Technologies, Inc., 1995.

Saxon, Kurt. *The Poor Man's James Bond.* 1972.

Schmutz, E.M. & Hamilton, L.B. *Plants That Poison.* Northland Publishing, p. 241.

Sidell, Frederick R. *Management of Chemical Warfare Agent Casualties.* HB Publishing, Bel Air, MD.

Stutz, Douglas R., PhD and Ulin, Scott, M.D. *Haztox, EMS Response to Hazardous Materials Incidents.* GDS Communications, Miramar, FL.

Uncle Fester. *Silent Death.* 1989.

Unknown. *Black Book Companion, State of the Art Improvised Munitions.* Paladin Press, Boulder, CO.

Unknown. *Improvised Munitions, Black Book,* Volumes 1 and 2. Paladin Press, Boulder, CO.

Viccellio, Peter, MD. *Handbook of Medical Toxicology.* Little, Brown and Company, Boston, MA.

Yeshua, Ilan *Chemical Warfare, A Family Defense Manual.* Israel, Center for Education Technology, 1990.

Internet References

NOTE:	The following locations on the World Wide Web (WWW) are subject to change without notice.

The CBIAC Homepage,
http://www.cbiac.apgea.army.mil/body.html

Chemical Agent Material Safety Data Sheets,
http://www.cbdcom.apgea.army.mil/RDA/erdec/risk/safety/msds/index.html

Chemical/Biological Incident Handbook. June 1995. The Director of Central Intelligence, Interagency Intelligence Committee on Terrorism, Community Counterterrorism Board.

The Chemical and Biological Weapons Chronicle,
http://www.stimson.org/pub/stimson/cwc/pub-chro.htm

Chemical Warfare and Chemical Warfare Protection,
http://www.opcw.nl/chemhaz/chemhome.htm

Chemical Warfare Agent Information,
http://www.opcw.nl/chemhaz/cwagents.htm

Disaster Management Central Resource,
http://206.39.77.2/DMCR/DMR.html

The Disaster Recovery Journal,
http://www.drj.com/

Federal Bureau of Investigation, Explosives Unit, Bomb Data Center,
http://www.fbi.gov/lab/bomsum/eubdc.htm

The Federal Emergency Management Agency,
http://www.fema.gov/

Medical Nuclear, Biological and Chemical Information Server,
http://www.nbc-med.org/

U.S. Army Chemical and Biological Defense Command (CBDCOM),
http://www.cbdcom.apgea.army.mil/cbdcom/

U.S. Army Medical Research and Materiel Command,
http://mrmc-www.army.mil/

U.S. Army Medical Research Institute of Chemical Defense,
http://chemdef.apgea.army.mil/

Vulnerability of the U.S. to CB Terrorism,
http://eaicorp.com/cbvuln.html

Yahoo! – Society and Culture: Crime: Crimes: Terrorism,
http://www.yahoo.com/Society_and_Culture/Crime/Crimes/Terrorism

THIS PAGE IS INTENTIONALLY LEFT BLANK

ANNEX H

ACRONYMS

AC	Hydrogen Cyanide
ALARA	As Low As Reasonably Achievable
ARDS	Adult Respiratory Distress Syndrome
BDO	Battle Dress Overgarment
CAS	Chemical Abstract Service
C/B	Chemical or Biological
CBR	Chemical, Biological, or Radiological
CDC	Centers for Disease Control and Prevention
CG	Phosgene
CK	Cyanogen Chloride
Cl	Chlorine
CNS	Central Nervous System
CONOPS	Concept of Operations
CPAP	Continuous Positive Airway Pressure
CPR	Cardiopulmonary Resuscitation
CSF	Classical Swine Fever
CW	Chemical Warfare
CWA	Chemical Warfare Agents
CX	Phosgene Oxime
DHHS	Department of Health and Human Services
DNA	Deoxyribonucleic Acid
DoD	Department of Defense
DOE	Department of Energy
DP	Diphosgene
EBR	Endogenous Biological Regulator
ECG	Electrocardiogram
EKG	Electrocardiogram
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FOG	Field Operations Guide
FRP	Federal Response Plan

GA	Tabun
GB	Sarin
GD	Soman
GI	Gastrointestinal
HAZMAT	Hazardous Materials
HCI	Hydrochloric Acid
Hct	Hematocrit
HD	Sulfur Mustard
HEPA	High-Efficiency Particulate
HIV	Human Immunodeficiency Virus
HN	Nitrogen Mustard
IC	Incident Commander
ICS	Incident Command System
ID	Identification
IDLH	Immediately Dangerous to Life and Health
IECS	Integrated Emergency Command Structure
IM	Intramuscular
IND	Improvised Nuclear Device
IND	Investigational New Drug
IV	Intravenous
L	Lewisite
LSD	Lysergic Acid Diethylamide
M	Mental Status/Mentation
MCFRS	Montgomery County Fire and Rescue Service
MCI	Multiple Casualty Incident
MDI	Methylene Diisocyanate
MIC	Methyl Isocyanate
NAERG	North American Emergency Response Guidebook
NBC	Nuclear, Biological, or Chemical
NEST	Nuclear Emergency Search Team
OSHA	Occupational Safety and Health Administration
P	Perfusion
PA	Public Address
PAPR	Powered Air Purifying Respirator
PDD	Presidential Decision Directive
PEEP	Positive End-Expiratory Pressure
PEL	Permissible Exposure Limit
PF	Protection Factor
PPE	Personal Protective Equipment
PPV	Positive Pressure Ventilation
PS	Chloropicrin

R	Respirations
RDD	Radiological Dispersal Device
REACT	Rescuer/Firefighter Protective Equipment, Environment, Agent Unique Factors, Concentration, and Time
RECON	Reconnaissance
REHAB	Rehabilitation
RNA	Ribonucleic Acid
SA	Arsine
SABA	Supplied Air Breathing Apparatus
SCBA	Self-Contained Breathing Apparatus
SEB	Staphylococcus Enterotoxin B
SLUDGE	Salivation, Lacrimation, Urination, Diarrhea, Gastrointestinal, and Emesis
SOP	Standard Operating Procedure
START	Simple Triage and Rapid Treatment
STEL	Short-Term Exposure Limit
TEU	Technical Escort Unit
TLV	Threshold Limit Value
TWA	Time-Weighted Average
USAMRIID	U.S. Army Medical Research Institute for Infectious Diseases
VEE	Venezuelan Equine Encephalitis
VX	O-ethylmethyl Phosphonothiolate (a nerve agent)
WBC	White Blood Count
WMD	Weapons of Mass Destruction

THIS PAGE IS INTENTIONALLY LEFT BLANK